# The Home Dietitian

Belle Wood-Comstock, M. D.

# The Home Dietitian

or

# Food and Health

THE AUTHOR AND HER SONS

# The Home Dietitian

or

# Food and Health

## Scientific Dietetics Practically Applied

---

By

BELLE WOOD-COMSTOCK, M. D.

Member of the Los Angeles County Medical Society, of the Los Angeles Obstetrical Society, and of the Professional Woman's Club of Los Angeles

---

REVIEW AND HERALD PUBLISHING ASSOCIATION
TAKOMA PARK, WASHINGTON, D. C.
SOUTH BEND, IND. PEEKSKILL, N. Y.

Printed in U. S A.

## INTRODUCTORY NOTE

MENDEL says: " Let us welcome the day when the food market and the kitchen are taken into consideration by the physician as seriously as are the apothecary shop and the fashionable watering place."

When people eat the proper kind and amount of food in the proper way, there will be little need for the physician except as a teacher and guide. Today the people's greatest need is education in normal living. Little good can come from spasmodic, desultory teaching. The mother, the housewife, must be thoroughly trained in the science of home-keeping and child culture, a most important phase of which is the feeding of the bodies of those in her care.

" What the average woman at the head of a home does not sufficiently grasp in all its importance, is that the very center of the household — the most important thing in the home — is the spread table with a meal on it. Look at the church. It is by no accident or mere coincident that the central sacrament of the Christian religion takes the form of a common meal. It represents a universal fact of human life. The domestic table is really the pivot upon which the whole home turns." — *Elizabeth Harrison.*

" The body is the foundation and not to be ignored. The people of power are those who have an efficient tool to carry out the mental and spiritual ideas." — *Dickenson.*

The mother has the opportunity of developing in her child the physical foundation that makes possible heights

of intellectual and spiritual growth. The problem must be solved in the home. Upon the housewife rests the responsibility. To her this book is humbly dedicated in the hope that it may help her in her task.

BELLE WOOD-COMSTOCK.

*"In the years of infancy and childhood, food and nourishment are of special moment; not alone for the time, but also for the child's future life. Through its diet a child may grow up to be — in the business of life — idle or industrious, dull or lively, weak or strong."— Froebel.*

*"Experiments have shown that physical endurance can be doubled by dietetic causes alone." — Fisher.*

## INTRODUCTION TO SECOND EDITION

THE favorable reception accorded the first edition of "The Home Dietitian" has been very gratifying, and is much appreciated.

Experimental work during the last few years has settled in an undebatable way many questions which for centuries were hidden in a maze of uncertainty and superstition. The question of nutrition no longer rests upon theory or conjecture, but has been placed on an undeniably safe scientific basis. Much is still not fully understood; many questions are yet to be answered, many details to be worked out; but the maze of uncertainty has been cleared away, and careful research simply serves to establish more firmly certain definite basic principles.

The calorie, at first received with great respect as the solution to all food problems, then by many set aside as of little value, is now accorded its proper place in the mathematics of nutrition. The vitamine, that vague something only recently viewed askance by the conservative investigator, has been established as a definite entity, to be ignored only at the risk of serious loss.

Much that is of value has been added to this edition; nothing to neutralize or underrate what has been presented before, but only that which establishes more firmly certain dietetic principles which cannot be gainsaid.

Somewhat under protest, but because of repeated demand for suggestions as to the application of dietetic principles in the feeding of the sick, we have in this edition added several chapters. These we trust will be helpful in the solution of many feeding problems in

times of ill health and disease; and assist, in a measure, to remove from the minds of the people the idea, with so many firmly fixed, that disease is something to be cured by a magic potion or a mechanical thrust.

Our thought has been to make the way so plain that the everyday student, the parent, the child, might receive in a practical way the benefit of the great work done by such men as Mendel, Osborne, Funk, McCollum, and others, who in solving these problems have rendered the greatest possible physical service to mankind.

Those who want arbitrary dietary outlines may be a bit disappointed; but to those who would, by careful study, seek to Master the simple underlying principles of nutrition, we offer this book, trusting that in it they may find the problem simplified.

THE AUTHOR.

*"Isn't it queer that some people care more for what they eat than for how they feel? The question is not how much good is this food going to do me, but how pleasant it will taste for an instant while it is passing through my mouth."—Journal of Public Health.*

## TABLE OF CONTENTS

*Health is a state of physical, mental, and moral equilibrium, a normal functionating of body, mind, and soul. It is the state when work is a pleasure, when the world looks good and beautiful, and the battle of life seems worth while. Health is the antithesis of disease, degeneracy, and crime. . . .*

*Health is the most desired of earthly blessings. When finally lost, it cannot be purchased by uncounted millions, restored by the alienist, or returned by the pulpit.— S. J. Crumbine.*

# CHAPTER I

## FOOD CLASSIFICATION; THE CYCLE OF LIFE

In the body, combined in various ways, are sixteen chemical elements: carbon, hydrogen, oxygen, nitrogen, sodium, potassium, magnesium, calcium, phosphorus, iron, sulphur, chlorine, iodine, bromine, fluorine, and silicon.

For the successful growing of crops there must be present in the soil a definite number of elements in normal amount and combination. Likewise for the normal development of human beings, there must be present in the food these sixteen elements in proper amount and proportion.

These are not taken into the body as elements, but are built up first into seven elemental food classes. These seven food classes are: carbohydrates, fats, proteins, vitamines, salts, cellulose, and water. Any daily food ration not containing these in proper proportion is defective.

### Food Elements

Class I.—*Carbohydrate,* made up of the chemical elements carbon, hydrogen, and oxygen, includes all starches and sugars, and is a fuel food. Its combustion in the body produces heat and energy. The carbohydrates make up a large part of the food value of grains, fruits, and vegetables.

Class II.—*Fat* is another, but more concentrated, fuel food, also containing carbon, hydrogen, and oxygen. This food element we have in butter, oils, fat meats, nuts, egg yolks, olives, the alligator pear, the soy bean; also to some extent in other legumes, in grains, and in vegetables.

Class III.— *Protein* is the muscle and tissue builder. It contains, in addition to carbon, hydrogen, and oxygen, another very important chemical element, called nitrogen, by reason of which it is often spoken of as nitrogenous food. Protein also contains variable amounts of other chemical elements, as sulphur, phosphorus, and sometimes iron, but its distinctive element is nitrogen. This food is found in a pure state in egg white, in the casein of milk, and in lean meat. In a combined form it makes up part of the food value of grains, vegetables, legumes, and nuts.

Class IV.— *Vitamines,* our knowledge of which is still somewhat limited, are doubtless the substances out of which the body makes its internal secretions, digestive enzymes, and the ferments of vegetative life processes. They are found in raw and fresh vegetables, fruit, raw milk, the outer covering of grains, and raw meat.

Class V.— *Salts,* both organic and inorganic, are made up of many different chemical elements, and are necessary for blood making and tissue building, for the carrying on of various metabolic and secretory processes, and for the maintenance of the proper alkalinity of all body fluids. They are found principally in fruits, vegetables, grains, and milk, and are located with the vitamines largely under the skin of fruits and vegetables and in or near the outer covering of grain.

Class VI.— *Cellulose* is really a carbohydrate, but being practically indigestible, is placed in a class by itself. It makes up the woody framework of fruits and vegetables. Its value is in its bulk, which by its presence prevents too great food concentration and mechanically stimulates the bowel, thus aiding in normal intestinal peristalsis.

Class VII.— *Water* plays an important part in the many chemical reactions and tissue changes continually

going on in the body; it holds the various salts in solution; it makes up the principal part of all body fluids and secretions; and, as a circulatory medium, it helps to make it possible for the body to regulate its own temperature.

All food is built up in nature's laboratory by a process called *synthesis*. For example, take the apple, which is made up chiefly of fruit sugar and cellulose, with accompanying vitamines, salts, and water. The sugar and cellulose, both belonging to the carbohydrate class, contain the chemical elements carbon, hydrogen, and oxygen.

### Nature's Laboratory

The chlorophyll, or green coloring matter of the plant, first manufactures starch, obtaining its carbon from the ever-present carbonic acid gas or carbon dioxide ($CO_2$) of the air, and giving back to the air the oxygen. Water ($H_2O$), coming up through the roots with its hydrogen and oxygen, supplies to the chlorophyll these elements to complete the process of starch making.[1]

From some of this starch, cellulose is made, and later, as the apple ripens, the remaining starch is changed into sugar.

In the same way the elements necessary for the vitamines and salts are obtained from the soil. All are combined in a wonderful way until we have as a result the finished product, the apple ripened and tinted by the sun.

Before it can be utilized in the body, however, a very different process goes on. From the time the apple is seized by the teeth the process becomes one of disintegration, or *analysis*, begun by the mechanical action of

[1] The chemical formula for starch is $(C_6H_{10}O_5)n$. The formation of starch in the plant may be represented by the chemical equation: $6CO_2$ (carbonic acid gas) $+ 5H_2O$ (water) $= C_6H_{10}O_5$ (starch) $+ O_{12}$(oxygen). The starch remains as a part of the plant — the oxygen returns to the air.

mastication. It is continued by the muscular activity of the digestive tract until the food becomes a thoroughly liquefied mass.

### A Twofold Phase of Digestion

But these physical changes are not sufficient. That the food may be yet more completely simplified and dissolved, certain juices are poured out along the digestive tract which break up the food molecules into still more simple forms, that the next important step may take place with the greatest ease and completeness. Thus, *chemical* action, in addition to *mechanical* action, prepares the food for the process of absorption into the body proper, where it may repair and build the tissues and produce the necessary heat and energy for the efficient conduct of all body processes.

In this digestive process all starch is changed to sugar (see footnote, page 59), all complex sugars to simple sugar or dextrose, fats are emulsified, and proteins are reduced to simpler forms called proteoses, peptones, and amino acids. Many of these processes can be carried on to some extent outside the digestive tract; thus we have certain predigested foods, such as dextrinized cereals, in which the starch has been largely changed to dextrin by extreme heat, e. g., oven toast, shredded wheat, corn flakes, etc. Likewise fats may be eaten in an already emulsified form, as in nut butter and cream. The sugar of fruit being in the form of dextrose and levulose (see top of page 59), needs practically no digestion.

Starch digestion begins in the mouth and is completed, with the simplifying of the complex sugars, in the small intestine. The solution of protein and its change into proteoses and peptones begin in the stomach and are completed, with its final reduction to amino

acids, in the intestine. The preparation of fat for absorption is carried on entirely in the intestines, by emulsification and by a process of splitting up into more simple parts, called saponification (soap formation). (See page 51.)

### A Carburetor

Thus the digestive tract becomes a great preparation chamber, a carburetor, as it were, where the food is transformed into a simple state and put into solution so that it can easily be taken up by the blood and thus carried to, and properly utilized by, the body cells.

Strange as it may seem, the digestive tract must be considered physiologically as outside the body proper. It is simply a tube extending *through* the body, but not connected *with* it except by an absorbing medium, the mucous membrane. It is continuous with the outside world from which it receives food substances and into which are discharged those parts which cannot be prepared for reception by the blood and tissues. The lining membrane of the digestive tract tries carefully to guard the body cavity against intrusion into it of substances which are undesirable or might do harm; and, normally, after careful preparation, only that part of the food which can serve as material to replace worn-out tissue or as fuel to produce heat and energy, is passed on into the blood.

### A Sentinel

However, as the result of putrefactive processes going on in the intestine, certain poisons are also carried through the mucous membrane. These would quickly prove fatal were it not for the faithful liver which stands as a sentinel to prevent these toxic materials from gaining entrance into the general circulation. The liquefied and simplified food passing through the mucous

membrane of the small intestine, enters many tiny blood vessels, or capillaries, which carry it to the portal vein, through which it is conveyed to the liver. Here the poisonous substances are filtered out to be transformed by the liver cells into harmless materials, and the purified food passes on into the general blood stream.[2] The liver also acts as a great storehouse for sugar, this part of the food entering the system according to body demands.

If, as a result of dietetic errors, intestinal putrefaction is excessive, the amount of toxic material taken up by the great absorbing surface of the small intestine may be so great that even the ever-vigilant liver is unable to filter out these poisons and to prevent their entrance into the blood, where they are carried throughout the body, causing various kinds and degrees of ill health.

### The Cycle of Life

Even though the food has been received by the blood, its analysis is not yet complete, but is carried on still further in connection with a form of oxidation or combustion. During this process the nutritive substances are utilized by the tissues, and finally, being reduced to a simple state, they are eliminated as waste by the lungs, skin, and kidneys. Now they can again be taken up by the plant and combined into materials which may be used as food by animals and man. Thus the cycle of life goes on, nothing ever lost, each chemical element being used again and again.

Just how these final steps in the process of food analysis are carried on in the tissues, we will consider further in the next chapter, in connection with the study of metabolism.

---

[2] The digested fat, called chyle, does not pass with the other food to the liver, but is absorbed directly into the lymphatic system.

# CHAPTER II

## THE BODY AS A STOVE; METABOLISM

It is important that we study more fully the oxidation processes through which the food passes after it is absorbed by the wall of the digestive tract. This final process of food reduction is included in the subject, *metabolism.*

### Cell Building

Food does not arrive at its ultimate destination until it reaches the individual cell. Here the nitrogenous portion is built up into the cell itself; the carbohydrate and fat afford energy for cell activity. Thus new cells are made, old cells are renewed, this process of cell building and repair being that part of metabolism known as *anabolism.*

In connection with the activity and life processes of the cell which are made possible by the energy resulting from the oxidation, or combustion, of the food taken up by the cell, waste material, made up of broken-down cells and the products of combustion, is produced which is carried by the blood stream to its proper outlet. This process of tearing down and waste formation is that part of metabolism called *katabolism.*

### The Fuel

In connection with these changes of waste and repair, or metabolism, the body may be compared to a stove. The food is the fuel, which is as truly burned in the tissues as is gas, wood, or coal burned in a furnace. This slow combustion is a true oxidation process, and oxygen is as necessary for the body fires as it is for the

more rapid oxidation which goes on in the ordinary stove. The lungs serve as both drafts and flue, and a perfect circulation of the oxygen received is made possible by the circulation of the blood. The kidneys are the grates through which the ash is eliminated.

The oxidation of carbohydrate and fat results in the production of heat, or other forms of energy, the end products being carbonic acid gas ($CO_2$) and water ($H_2O$). These are eliminated through the lungs, the skin, and the kidneys as simple gas and water. There is *no ash,* just as there is none from the burning of gas in a gas heater. Starches, sugars, and fats are simply fuel foods necessary for heat and energy, but have nothing to do with tissue repair.

## Tissue Building

Tissue repair is the additional work of protein. Protein contains nitrogen in addition to its carbon, hydrogen, and oxygen. The nitrogen is used in the work of cell building and cell repair. It is the iron of the stove and while not needed in such large amounts, is of vital importance; for if the body stove is not kept in constant repair, it will soon enter a state of dissolution. As protein contains carbon, hydrogen, and oxygen, some heat and energy results from the oxidation of this part of the protein molecule, which is about 58 per cent of the whole. Carbon dioxide and water are in this way given off, but the distinctive work of this food element has to do with its nitrogenous portion (see page 85).

## Building Stones

The protein molecule is very complex, and varies within wide limits. Its nitrogen is always combined with carbon, hydrogen, and oxygen, but in many different ways to form different kinds of protein. The

arrangement of the nitrogenous combinations in the food proteins is different from that of the tissue proteins, so after the breaking-down process that the food undergoes in connection with digestion, the nitrogenous links are put together again in the various necessary combinations to form the many kinds of tissue. A complete protein contains seventeen or eighteen of these nitrogenous units, which are called *amino acids* and have been likened to building stones. (See pages 43 and 76.) Rearrangement of these amino acids makes possible the formation of the tissues that go to make up the body. (An amino acid contains the radical $NH_2$.)

## The Body Grates

As the result of cellular activity and oxidation, a definite *solid ash* is formed, in which form the nitrogen is eliminated through the body grates, or kidneys, in solution in the urine. Urea, uric acid, purines, creatine, and other allied bodies make up this solid ash. The most completely reduced form is *urea,* which is the most important end product of protein metabolism, and the form in which the greater part of the nitrogen is eliminated. There is normally, however, a certain small part of the ash not so completely metabolized, which must be eliminated as uric acid and purines, but these in excess soon become abnormal.

## An Expensive Fuel

Any protein not needed for tissue building may be used by the body to produce heat and energy, the nitrogen being split off and eliminated in the usual way. But this would be a waste of nitrogen, and a needless task imposed on the excretory organs. It could not, therefore, be considered economy if it were possible to obtain this energy from the strictly fuel foods that leave

no nitrogen for elimination. This use of nitrogen would be analogous to burning iron in a furnace. While it might be possible, it would hardly, under ordinary circumstances, be considered wise or economical.

### Clinkers and Soot

Thus as the result of oxidation and reduction processes, the food, whether carbohydrate, fat, or protein, is reduced to a simple state which makes complete elimination from the body possible. If for any reason oxidation is incomplete, the process of elimination is greatly hindered; the ash is not finely divided, but is full of clinkers, the grate becomes clogged, and waste products are retained, which further clog the body stove and hinder the normal oxidation processes. Incomplete oxidation of carbohydrates and fats may also clog the tissues in much the same way as soot clogs a gas burner when, as the result of incomplete oxidation, it gives a yellow flame with its unoxidized carbon, instead of a blue flame, in which all carbon is thoroughly burned. (See page 28.)

For this reason it is important that the body fuel, while sufficient, be not excessive, that the drafts be kept well open, and that there be a free circulation of oxygen. Then the fuel will be thoroughly burned, the ash finely divided, and elimination will be complete. There will be no soot, clinkers will not clog up the grate or back up into the stove, and the stove will not smoke. The vital fires will burn brightly, and all organic functions will be carried on in the normal way that makes for health and strength.

## CHAPTER III

### DEFECTIVE FOOD ANALYSIS; AUTO-INTOXICATION

WE have seen that the passage of the food through the body means a gradual reduction from a complex to a simple state. That this reduction should go on in a normal way and at a normal rate, is all-important. Certain conditions, chiefly dietetic errors, result in great interference with these processes, both while the food is still in the digestive tract and after absorption, when it has been taken up by the blood and tissues,— the first, slow and imperfect digestion; the second, faulty and incomplete metabolism.

#### A Serious Defect

The first and most common defect in food analysis is in the process of mastication. Carelessness in regard to this most important initial process lies at the foundation of much of the imperfect digestion in the lower alimentary tract.

As the result of imperfect disintegration in the mouth, food substances are hurried into the stomach faster and in larger amounts than they can properly be received and cared for. Food received by the stomach in normal, well-masticated portions, already in a semiliquid state, begins at once to leave the stomach, the amount taken in continually bearing such a relation to that passing out that at no time is the organ overdistended and thus handicapped in its muscular movement.[1]

[1] X-ray study has shown that the liquid portion of the food begins at once to leave the stomach, the more solid portions remaining for further digestion. As the acid contents of the stomach rush through the pylorus (the outlet of the stomach) into the first part of the small intestine, or duodenum, the pylorus closes, the bile

But the rapid introduction into the stomach of improperly prepared material at once tends to overwhelm the organ, and would, could it be seen, produce as unsightly a spectacle as crowding the mouth so full of food that mastication is made awkward and almost impossible. This food, not having been properly reduced before swallowing, requires an excessive amount of churning by the stomach wall, which is already handicapped by overdistention.

### Advantage of Slow Eating

Incomplete mastication means hurried eating. Hurried eating leads to overeating, because the introduction of food has been so rapid that the nerve impulses have not had time to return with their message, "Enough;" and thus by the time the sensation of hunger has disappeared, an excess of food has been taken. Every one knows how, if called away from a hurried meal, appetite perhaps still keen, he may return later, only to find himself satisfied with the food already taken. The nerve impulses of satiety take a little time to report, hence the advantage of slow eating. If one must eat hurriedly, his only safety lies in eating within safe limits as to the amount, and stopping his meal while yet the appetite may call for more.

Indigestible food substances, wrong combinations, eating at too frequent intervals, all play their part in causing slow and difficult digestion, and thus hindering the normal passage of the food through the alimentary tract.

---

and the pancreatic juice flow through a common opening into the duodenum, neutralizing by their alkalinity the acidity of the food material from the stomach. As the contents of the duodenum become neutral, or alkaline, the pylorus relaxes, and more of the gradually liquefying food, or chyme, passes out of the stomach. Again the reflex effect of the acid fluid on the duodenal mucous membrane causes a contraction of the pyloric sphincter, and the stomach outlet is closed, and the same alternating process is continued until stomach digestion is complete and the organ is at rest. The length of time required depends upon the amount, kinds, and combination of foods taken into the stomach, and varies normally from two to six hours.

### Three Results of Delay

Stagnation in the stomach or intestine, whatever the cause, means one or all of three abnormal processes. Food must be properly digested and absorbed, or carbohydrates will ferment, protein will putrefy, fats will become rancid. These processes take place in the digestive canal as quickly as outside it, and often sooner, because the conditions are ideal for germ growth.

In the stomach, because of the presence of the germicidal hydrochloric acid, germ activity is hindered and under normal conditions made impossible. But under the conditions mentioned above, fermentation often takes place, resulting in "sour stomach," gas formation, and a general bad state of affairs.

### Germs at Work

In the intestine, the food having been longer on the way and the secretions being alkaline instead of acid, germ activity goes on to a great extent. Under normal conditions this may even assist in the dissolution of the food; but very quickly, under conditions of slow digestion and retention, food decomposition becomes abnormal, fermentation and putrefaction are set up, resulting in the formation of gases and irritating substances that greatly interfere with peristalsis and with the completion of digestion. The amino acids, instead of being allowed to pass unhindered through the mucous membrane into the blood, are broken down by the germs into decomposition products. Poisons are formed which, being absorbed, often overwhelm the liver (see page 16), get by into the blood stream, and slowly but surely intoxicate the individual.

### Self-Poisoning

As the result of carbohydrate fermentation, alcohol and kindred products may be formed, the absorption of

which may produce symptoms of chronic alcoholism in the total abstainer. The absorption of the products of protein putrefaction, becoming excessive and acute, spells "bilious attacks" or perhaps "ptomaine poisoning," but oftener in a chronic way these poisons gradually do their work, causing abnormal fatigue, lowered nerve tone, irritable nerves, headaches, sallow skin, diminished vitality, and functional disturbances of any or all of the organs.

Thus in this great preparation chamber there may be prepared for absorption, poisons as well as food. The food itself being incompletely digested, much of it may not be absorbed, and so may never reach its destination. The cells, instead of receiving their needed nourishment, are handicapped by poisons, and their activity is enfeebled. This condition of poisoning from one's own digestive tract is known as "auto-intoxication," or self-poisoning, and is widespread, lying at the foundation of many of the ailments and diseases that beset the civilized race.

## A Reckoning Time

With those who are naturally robust it may seem that the limit of work imposed upon the stomach and intestine need only be determined by the appetite and inclination of the individual. But be the digestive organs ever so strong, with the ingestion of incompletely masticated food in unlimited kind, variety, and amount, perhaps improperly prepared or in combination with substances difficult of digestion, there will come a time when these faithful organs will be unable to do the work given them to do, even though the amount of work be decreased to normal limits. And often long before symptoms directly referable to the digestive tract manifest themselves, the amount of putrefaction may

have reached the stage where the vitality is greatly lowered, signs of toxemia appear, and gradually but surely the health and efficiency of the individual is undermined.

There are many who, having a smaller amount of inherent strength in the digestive organs, feel sooner the results of the conventional careless habits of eating. Not realizing the cause of their earlier symptoms, they continue in their dietetic mistakes until a radical program which admits to the alimentary canal only the simplest and most easily digested foods, is necessary to give the organs of alimentation an opportunity to catch up, as it were, and to lay in a store of reserve strength that they may, perchance at some future time, be able to carry on a normal amount of work.

### A Type

This type of person is sometimes spoken of as the auto-intoxication type, and he is found in all stages and in all grades. Under this head comes the one who eats but grows thinner, and wonders why; the one who suffers from the occasional bilious attack and certain type of sick headache; the nervously exhausted person with aches too numerous to mention and symptoms as varied as temperament and susceptibility may differ; the dyspeptic, sallow, thin, despondent, suffering from indigestion, gastric distress, constipation, and "gas," the digestive organs, unequal to their task, accomplishing the little they do by much coaxing, the tenderest of care, and artificial aid.

### Anemia

The cause of anemia and serious organic disorders of the nervous system is coming more and more to be considered referable to excessive putrefaction in the intestine, with slow absorption of poisons.

Thus we have a picture of some of the various conditions often resulting when the first steps in body food analysis or reduction are not carried on properly. No one can estimate the reserve strength of his digestive organs. Often the one who early has evidence of a weak digestion, is fortunate because he is of necessity led to form careful dietetic habits. And therefore it were well could all adopt a sensible, sane plan of eating, following natural law, eating for strength and not for drunkenness, wisely selecting and preparing their food, and partaking of it in such a way as to assist rather than hinder nature in her efforts to utilize it to the best advantage.

*"Life is shortened by death and narrowed by invalidity."— Fisher.*

*"To keep the body in a healthy condition, to develop its strength, that every part of the living machinery may act harmoniously, should be the first study of our lives."— White.*

# CHAPTER IV

## DEFECTIVE FOOD ANALYSIS (Continued); SUBOXIDATION

### Results More Remote

As has already been suggested, there are those who suffer little, if any, from digestive disturbance, because they are endowed by nature with great vitality and organic strength.

They can "digest anything," can eat at any time, anything their palate calls for, and never suffer the discomforts of indigestion. One's first thought might be, How fortunate are these! but that is not entirely true of them; for their carelessness and ignorance in connection with alimentation will lead to a condition of ill health more remote perhaps, but as truly the result of dietetic errors, as are those of the previous class, and often these results prove more disastrous in the end.

### Another Type

These diseases come under the head of metabolic disorders, and, in the light of our comparison of the body to a stove, we will speak of them as conditions due to suboxidation and of the individual suffering from them as belonging to the suboxidation type. In these persons oxidation is imperfect, elimination of cell waste is incomplete, the tissues become clogged with substances which should be eliminated, the grates, or kidneys, do their work incompletely, and "the stove smokes." The "fires are banked."

As has already been made plain in a previous chapter, protein metabolism results in the formation of a

solid ash which is in the form of urea, uric acid,[1] purine bodies, creatine, and certain other related substances. The most important of these is urea, in which form most of the nitrogen is eliminated.

### Rheumatism

In order for this ash to be properly eliminated it must be finely divided by a process of oxidation and analysis. Imperfect metabolism is always associated with suboxidation, and the result is an excess of an incompletely oxidized protein ash, which backs up in the blood stream as "clinkers." These accumulate in the joints, producing rheumatism, so called, and in the muscles they are the cause of lumbago and myalgia; along the nerve sheaths their irritating presence may produce neuritis; accumulating in the blood vessel walls, they cause the arteries to lose their supple, elastic quality and to become hard, stiff, and brittle, which in the end means high blood pressure, an overworked heart, and often apoplexy, angina pectoris, and heart failure. The kidneys in their effort to eliminate an excess of waste, and that in an imperfectly prepared form, are overworked, and Bright's disease may be the result.

Conditions of suboxidation are never limited to protein metabolism alone, but there is ever an associated suboxidation of carbohydrates and fats; in fact, it seems, often, to be the imperfect metabolism of an excess of energy foods that is the causative factor in the production of deficient protein oxidation. (See page 20.) The body stove being clogged with the products of incomplete

---

[1] Uric acid ($C_3H_4N_4O_3$) and the purine bodies, as xanthine, hypoxanthine, etc., are very closely related both chemically and physiologically to each other and to the caffeine ($C_8H_{10}N_4O_2$) of tea and coffee and the theobromine ($C_7H_8N_4O_2$) of cocoa. Uric acid and the purines result principally from the metabolism of the nucleoproteins. Nucleoprotein is abundant in meat, especially in glandular tissue, as liver, sweetbreads, etc. A purine-free diet is one in which meats and tea and coffee are excluded. Purines are found also to an extent in some other foods, as, e. g., eggs and legumes.

carbohydrate and fat metabolism, cannot carry on the active oxidation processes necessary to burn up the protein wastes, whether or not excessive.

## A Cause of Obesity

Carbohydrate, containing the same chemical elements as fat, is readily changed over in the tissues into fat, and these two food classes, instead of being used up in energy production, may be stored excessively as adipose tissue, and this often at the expense of muscle.

So in this type we have the obese, rheumatic, gouty individual, short of breath, for whom exercise becomes difficult, thus adding another factor in the causation of the ever-increasing condition of suboxidation.

## Ills Due to Wrong Habits

But this suboxidation type of person has a good digestion, with its accompanying good appetite, is fond of rich, concentrated food, and, unaware that his ills are directly due to his wrong habits of eating, he goes blindly on overloading his body furnace with fuel that it cannot oxidize, or eliminate, and that only serves to increase the clinkers that hinder the burning of the vital fires.

Often it is not the bulk of the food intake, but its concentration in fats and sweets, that determines its excess, and as we study further the question of food values, it will be seen how easily food can be taken in excess of body needs.

While some may suffer from underfeeding, yet in conditions of prosperity the diseases of the race due to improper alimentation are the result, almost entirely, of an excess of food, rather than the result of a deficient amount, a condition of underfeeding sometimes following on as the result of conditions caused primarily by a too-abundant food intake.

### Important Conditions

Again we will enumerate the conditions necessary for perfect oxidation and thereby make evident the remedy:

1. Proper kind and amount of fuel — a properly balanced food supply in direct proportion to body needs.

2. Open drafts: (*a*) an ample supply of oxygen through the lungs; (*b*) the carrying of the oxygen to every cell by a free circulation of the blood, made possible only by exercise.

3. A finely divided ash, free from clinkers, so that thorough elimination may be possible. This may necessitate a limited intake of fuel for a time, giving the body a chance to burn up what is already on hand in excess.

### Exercise

The subject of eating cannot be separated from that of the oxygen we breathe in, and the exercise we are able to take. An ample supply of oxygen must reach the lungs, but oxygen which goes no farther than the lungs does the tissues no good. It must be carried throughout the body by the blood, a perfect circulation of which is possible only under conditions of more or less vigorous exercise. The freely moving blood stream carries both fuel and oxygen to the cells and thoroughly cleanses tissue, muscle, and organ from waste matter, carrying these wastes to their avenues of elimination.

Often the person suffering from suboxidation reaches the point where, because of obesity, fatty heart, or high blood pressure, exercise is impossible. Under these conditions the problem of increasing the circulation and the metabolic processes becomes largely one of diet regulation, the exercise, of necessity, being largely passive, as in massage and manual Swedish movements.

The intelligent treatment of obesity, with its allied conditions, by diet adjustment upon the basis of measuring

the fuel supply is most satisfactory, the treatment of no abnormal condition promising more sure results.[2]

Defective food analysis, whether in the digestive tract or in the tissues, lessens the alkalinity of all body fluids, producing a more nearly acid condition of the blood. Acids are formed as the result of fermentation and abnormal food decomposition in the intestinal tract, and as the result of cell waste and katabolism in the tissues.[3] These wastes, not being properly oxidized and eliminated, lessen the alkalinity of the blood because of the excess of acid products. (See page 52.)

While all of these conditions do not come to one individual, and to many only in a minor degree, yet the ever-increasing occurrence of these diseases with, because of them, the lowered life expectancy of the man past forty, bears witness to the fact that metabolic disorders are becoming more prevalent and must be reckoned with in the struggle for race conservation.

As diseases of metabolism are so common and most of them due to an improper food supply, the understanding of food values, as to both quality and quantity, becomes a very important matter. How we may measure our food intake easily, but scientifically, and make this knowledge of practical value, we shall consider in our next chapter.

---

[2] To those who desire to study more fully the dietetic treatment of obesity, we would recommend that amusing and instructive little book by Dr. Lulu Hunt-Peters, "Diet and Health with Key to the Calories."

[3] There is a difference in the acidity of the ash resulting from the metabolism of various foods, e. g., the metabolism of meat yields an acid ash, that of vegetables an alkaline ash. Most fruits are base forming, thus increasing the alkalinity of the blood (see Chapter VIII), while cereals furnish in their metabolism a preponderance of acid.

*"Our bodies, in other words, should be such good machines that their running will cause no creaking or jolting."— Hare.*

# CHAPTER V

## THE FOOD UNIT, OR CALORIE

### How Much Fuel?

Of the seven food classes, three are oxidized in the body and may be measured by the calorie, or heat unit. In this way we may as easily measure our body intake of fuel as can the manufacturer who estimates the amount of coal necessary to furnish the energy required to run the machinery of his plant. Every ounce of protein, fat, or carbohydrate taken into the tissues produces a definite amount of heat. Heat can always be converted into energy.

### The Calorimeter

The instrument used in measuring the heat value of food is called a calorimeter, and simply described is this: A double chamber — in the inner chamber a given quantity of food, e. g., an ounce of sugar; in the outer chamber a given quantity of water of a known temperature. The food in the inner chamber is ignited by an electric spark. When the burning is complete, the temperature of the water in the outer chamber is taken and the increase in temperature shows the energy or caloric value of that food.

### The Calorie

The amount of heat required to raise the temperature of a pound of water 4° F., or of one kilogram of water 1° C., is a *calorie*. The slow combustion of an ounce of food in the body tissues will produce the same amount of heat as if oxidized rapidly in a calorimeter.

By experiment it has been found that the heat value of a gram of pure water-free protein, e. g., the casein

of milk, egg albumen, fiber of meat, is four calories; of a gram of pure carbohydrate, as starch or sugar, four calories; but of a gram of fat, more than two times as much, or nine calories.[1] An ounce equals about thirty grams; therefore, multiplying the above figures by thirty, gives the number of calories per ounce.

Different foods contain varying amounts of these oxidizable substances; accordingly, the caloric value of foodstuffs depends upon the amount of protein, fat, or carbohydrate they contain; e. g., an ordinary slice of bread weighing 1¼ ounces, or 38 grams, contains approximately 4 grams of protein, 2 grams of fat, and 16 grams of carbohydrate, the 16 grams remaining being water and cellulose.

| | |
|---|---|
| 4 grams of protein equals ...... | 16 calories |
| 2 grams of fat equals .......... | 18 calories |
| 16 grams of carbohydrate equals .. | 64 calories |
| Total ...................... | 98 calories |

Or approximately 100 calories.

By a little study, one may very easily become familiar with the approximate values of common foods and be able to arrive at some conclusion as to what one's daily ration should be, both as to its amount and as to the proportion of food elements. Many would be surprised to find how far short their diet comes of the ideal, which, if followed, with proper habits of eating, would result in the maximum of health and strength.

### A Practical Application

It is very easy to remember that one slice of bread contains 100 food units, one egg 75, a glass of milk 150, an average potato 125, a tablespoonful of average cream about 40, a serving of cooked cereal 75 to 100 calories,

[1] More accurately — 1 gram of protein equals 4.1 calories; 1 gram of carbohydrates equals 4.1 calories; and 1 gram of fat equals 9.3 calories.

an ordinary serving of green and leaf vegetables 25 to 50, depending upon the amount of fat or milk added, average serving of legumes 100 to 150 calories; also that desserts are higher in food value, ranging from 125 calories for a simple custard or junket to 350 for one sixth of a pie. (See table of food values in the Appendix.) These and many others in a short time become very familiar to the housewife interested in food values.

## Food Requirements

The amount of food required by an individual varies with height, age, sex, and muscular activity, but for the average person 2,000 calories may be taken as a working basis. One above average height will need more perhaps. Other things being equal, men need about 10 per cent more than women. If engaged in active, muscular labor, the requirements may be 2,500 to 3,000, or even more in the case of a farmer, a lumberman, or a soldier. Those of sedentary habits often do better on less than 2,000, or even as low as 1,500 to 1,800 calories. This will depend upon the height, temperament, and natural tissue activity.

An obese person or one suffering from the results of imperfect oxidation, as manifested by rheumatic joints or high blood pressure, may do well for a time on as low as from 1,000 to 1,200 food units daily, with marked relief from symptoms; and, if obese, a reduction of from one to four pounds a week.

## How Much Protein?

The amount of protein needed does not vary within such wide limits. The amount remains more nearly constant, and should yield from 200 to 300 calories in twenty-four hours, even though the total ration be low. On the average ration this would be about 10 per cent

of the entire daily food intake, but if one does well on the low ration as suggested above, the protein must not be reduced proportionately, but should be kept near the normal of at least 200 calories; for the body, not being able to store this repair material in excess, must have it supplied to it in regular daily amounts.

## How Much Fat?

The fat intake should yield from 400 to 800 food units a day.[2] A study of food values soon makes it very evident that the average individual takes much more than this amount in his daily food ration. The remainder of the total calories is made up of carbohydrate. Fat and carbohydrate can to an extent be substituted one for the other, but an excess of fat should be avoided. This we will discuss in a later chapter.

## Food Values

Those who may want to familiarize themselves more thoroughly with food values, we would refer to tables of caloric food values Nos. I and II, in the Appendix. Table I gives the approximate energy value of the cooked and ready-to-serve foods commonly used. An effort has been made to arrange them so that the housewife may be able to see at a glance the food value of the average helping of the various dishes appearing upon her table, and the proportion of protein, fat, and carbohydrate contained in each. These percentages are of the *total number of food units* and *not of the weight*. Fractions and decimals have been disregarded in most cases.

Because of the variation in recipes for the same dish, many of the figures in the tables can only be approxi-

---

[2] This need not be in the form of free fat. Many foods contain a high proportion of fat, as milk, eggs, olives, nuts.

mate, but given the ingredients, the value of any dish may be estimated with a fair degree of accuracy by the use of Table II. (See page 339.) This table gives the value of staple foodstuffs, both raw and cooked, used in cooking and in the making up of various recipes. From this table the housewife may easily estimate the calories contained in a serving of any dish she may prepare.

Take for example the following recipe:

**Spinach Soup**

| | Protein Calories | Fat Calories | Carbo-hydrate Calories | Total Calories | |
|---|---|---|---|---|---|
| Spinach, 1 quart (4 oz.) ........... | 9 | 6.5 | 12 | 27.5 | See p. 344 |
| Onion, 1 thin slice ................ | .5 | .5 | 4 | 5 | See p. 343 |
| Stale bread, 2 slices .............. | 26 | 12 | 162 | 200 | See p. 340 |
| Skim milk, 1 quart ................ | 128 | 24 | 192 | 344 | See p. 342 |
| For six servings divide by 6 ....... | 163.5 | 43 | 370 | 576.5 | |
| | 27 | 7 | 62 | 96 | |

Therefore, each serving of soup will contain 96 calories, of which 27 are protein, 7 are fat, and 62 are carbohydrate.

Put the spinach and onion through the meat chopper, following with the bread to prevent waste. Put into a double boiler with the milk, and cook until tender. This is a relatively high protein dish, more than one fourth of the calories being protein, and shows a good use for skim milk and stale bread. *Try it.*

These tables are simply for reference, and in no way need add to the housewife's burdens. But those interested will find them very simple and easy to use, and a great help when it is desired "to take inventory," as it were, of the food situation in any home, or in any individual case. In a very short time the housewife may find that she has a mental picture of foods, as to their energy value, far different than she ever had before;

and she can at any time she wishes check up as to the amount of food any member of her family may be taking. More important even than to determine the total amount is the ease with which she may be able to find out how much protein she is furnishing the members of her family. This we shall discuss further in the next chapter.

*"All that is taken into the stomach above that which the system can convert into good blood, clogs the living machine.*

*"The system receives less nourishment from too great a quantity of food, even of the right quality, than from a moderate quantity taken at regular intervals."— White.*

# CHAPTER VI

## A BALANCED RATION — PROTEIN

### Ample Supply Important

As has been made plain in previous chapters, it is very necessary that the supply of oxidizable food be correct, not only as to total amount, but also as regards proper balance. Each article of food eaten should bear its proper relation to all the others, and to the entire intake for the meal. While this is true of all the food elements, it is undoubtedly in the normal adjustment of the protein part of the diet that mistakes are most often made and with the most serious results. While an excess of fat is harmful, yet a comparatively small amount may not be deleterious, providing it is of the right kind and the necessary food units are made up in carbohydrates. But with the protein, error may easily be made on either side, and while much has been said in regard to protein in excess, quite as much stress should be laid on the importance of getting enough.

Tissue repair being dependent upon nitrogen, it is obvious that enough protein is needed in the food to supply the necessary nitrogen to rebuild worn-out cells.[1] The

---

[1] The normal adult body should be kept in nitrogenous equilibrium, i. e., the protein intake equal to the outgo. The intake is proportionate to the food ingested; the outgo is indicated by the nitrogen eliminated in the urine, which can be determined by laboratory tests. The body is out of nitrogenous equilibrium when the protein intake is not sufficient to replace worn-out tissue, as in cases of depleted food supply, or in disease with insufficient food ingestion or assimilation. Here the intake is less than the outgo, and if continued, death must finally result.

The body is also out of nitrogenous equilibrium when protein is used not only to replace worn-out cells, but also to construct new tissue. This is the case in convalescence from wasting disease, as in fevers, tuberculosis, etc. In these cases the ingestion is in excess of the elimination, and should continue so until a normal balance is reached. Normally the growing child takes in more protein than is eliminated, because of continually developing cells and tissues. Here again the body is out of nitrogenous equilibrium, but necessarily so, and should be on the safe side of an ample supply. In some cases of suboxidation the nitrogen eliminated is less than the amount ingested, because of an excessive intake and insufficient activity of the organs of elimination. This lack of balance is abnormal and results in disease.

ideal balance is the one that supplies to the tissues the amount and kind of protein essential for its specific purpose and not a great deal in excess of that amount. Protein cannot be stored in the tissues in excess, and so must be supplied to the body in regular daily amounts, the amount needed varying within much narrower limits than that of fat and carbohydrate and much less dependent upon varying conditions of exercise.

### Protein Ration Constant

Unless engaged in very active muscular exercise, 2,000 to 2,500 food units is sufficient for the person of average height, and many leading sedentary lives do much better on from 1,600 to 1,800 in twenty-four hours. All, however, need from 200 to 300 calories daily of protein. If one requires 2,000 calories total and 200 calories of protein, the amount of protein necessary would be 1-10, or 10 per cent of the total ration. But if an individual of sedentary habits needs only 1,600 calories, total, he would still need the 200 protein units, making his necessary protein 12½ per cent. It is very important, then, to bear in mind that the amount of protein should remain comparatively constant, and that if, for any reason, the total food intake be low, the protein must not be materially reduced.

This is well illustrated in the treatment of obesity. If the daily amount of protein be kept up to nearly normal, a marked reduction in the total food intake may be made without inconvenience to the patient. (See footnote 2, page 31.)

### An Obesity Cure

On a ration of 1,000 or 1,200 food units daily, including the needed protein, 200 to 250 calories, a weekly loss in weight of two to four pounds may be accomplished and the individual not suffer from hunger, but

maintain his strength and discharge his regular daily duties. In fact, the body being gradually relieved of an unnecessary burden, various associated ailments due to suboxidation (see Chapter IV) disappear and one feels well rewarded for any self-denial necessitated. Such a regimen should, however, be carried out under the supervision of a physician, and is often combined with graduated exercise and tonic baths.

An abnormally low protein aliment leads to anemia, tuberculosis, malnutrition, nervous exhaustion, and other chronic and functional disorders.

### How to Know

But how may we know whether or not our protein ration is properly related to our total daily intake? By referring to the tables of food values as given in the Appendix the percentage of protein in various foods may readily be seen, and, with a knowledge of these proportions, the higher protein foods may be combined with the foods lower in nitrogen in such a way as to maintain the necessary protein percentage, thus giving to the body this tissue-building element in the normal amount.

### Overeat and Undereat at the Same Time

Those who partake freely of meat are in no danger of deficiency in protein, their danger lies in getting an oversupply; but vegetarians often make the mistake of unbalancing their daily ration so as to overeat and to undereat at the same time. Their foods are often combined in such a way that it is necessary for them to overeat of the total amount in order to obtain the body requirement of nitrogenous food; thus we frequently find such an individual poorly nourished and unsatisfied, while at the same time he suffers the effects of overeating and indigestion.

### Protein Balance Disturbed

In the preparation of food the protein balance is often disturbed by the addition of an excess of fat or sugar or both. Take for example an Irish potato containing 100 calories, ten calories, or 10 per cent, of which are protein. Add to this 50 calories of butter. The protein calories still remaining ten, the percentage of protein is now 6⅔. Likewise, beans, always considered a high protein dish, may be made relatively a medium or even a low protein food by the addition of a free amount of fat in their preparation. An ordinary serving of oatmeal with whole milk contains about 150 calories, of which 27 calories, or 18 per cent, are protein. If to this, 50 calories of sugar are added, and cream, with its high percentage of fat, is used instead of milk, the serving has been reduced from a high to a low protein dish, the amount of protein being even as low as 8 per cent of the total food units. If cream were used but no sugar, the percentage of protein would drop to 9½. The addition of the cream and sugar greatly increases the total food value without adding any protein.

### Bread as a Protein Food

Even the homely but much depended upon article of diet, bread, has a goodly proportion of protein, 12 to 16 per cent. (See table, Appendix.) But as ordinarily eaten with butter, marmalade, or jelly, it descends greatly in the scale as a protein food. For example, one slice of whole-wheat bread equals 100 calories, of which 15 calories are protein. Adding to this 50 calories of butter, the total food value becomes 150; the protein calories, still 15, make the relation of protein to the total just 10 per cent. Foods served in this way may be most excellent foods, but if every dish is so prepared that it contains 10 per cent or less protein, it is quite

evident that there is great danger of the protein intake being too low, unless the entire food ration be kept high, which might in many cases make the total more than necessary for body needs.

Then, too, it must be remembered that many foods, as fruit, desserts, sweets, etc., contain practically no protein, so that somewhere in the daily ration there must be food containing much more than 10 per cent protein. When *energy* foods are taken in concentration, it is necessary to use concentrated *protein* food in the form of meat, milk, or eggs, in order to maintain the normal protein balance. This is one reason for the need of milk and eggs in the diet of the ordinary vegetarian. The converse is obvious. If one is to limit his concentration of protein food, and this is in many cases desirable, he must minimize the amount of his concentrated energy food, deriving his necessary calories from natural unrefined products. (See page 211.)

## The Brain Worker

We may consider as an exception to this the farmer who needs from 3,000 to 3,500 food units daily, or perhaps more. He easily gets his necessary 250 to 300 calories protein, even while living on medium and low protein foods. He uses up the excess of carbohydrate and fat in the energy he expends in his active labor; but the one who needs, because of a sedentary life, to be careful not to overeat, must take foods richer in protein. Brain workers, or those who expend nervous rather than muscular energy, need a comparatively high protein ration with a low total intake; for while they need nearly as much protein as the farmer, they may need only about half his total number of calories. They must maintain a protein balance of 1: 6 or 1: 8, perhaps, instead of 1: 9 or 1: 10. They must, therefore, live on the higher protein foods.

### The Convalescent

A person convalescing from a wasting disease must have ample protein to rebuild tissue, but often his digestive organs are not equal to the task of caring for a total amount of 2,000 or more calories. So the diet for such a one must be so planned that the proportion of the tissue-building elements be high in order that enough of this may be supplied, even though the entire daily intake must of necessity be lower than normal.

### If You Are Too Thin

Many thin people would gain in weight more readily on a diet supplying a goodly amount of protein, with less of the carbohydrate and fat and even a low total daily ration, than on one in which the entire food intake is pushed to an extreme degree, imposing an extra tax on the digestive organs in their effort to care for an excessive amount of food material which never can be got ready for absorption and utilization by the tissues.

### Complete Proteins

There is another important phase of the protein question that must be considered. We have referred in Chapter II to the complex structure of proteins and to the fact that complete proteins contain some seventeen nitrogenous combinations called amino acids. These seventeen parts may be arranged in many different ways to form various kinds of body tissue. Proteins, in order to repair every kind of tissue, must contain all of these seventeen units, and such proteins are said to be complete. There are other proteins in which some of these important combinations of nitrogen, or " building stones," are missing and so are incomplete. Some of the important amino acids are, tyrosine, tryptophane, leucine, lysine, glycocoll, cystine, histidine, and arginine.

### Quality as Well as Quantity

It is quite evident, then, that all proteins are not of equal value to the body and that a diet may be deficient in the quality of its protein as well as in the quantity. While this question is not yet fully understood, nevertheless, as the result of animal experimentation, something of the nature of the various food proteins has been ascertained. For example, it has been shown that some proteins will maintain but will not induce growth. Rats fed on corn fail to grow, but develop properly if their diet is supplemented by casein of milk, egg yolks, the proteins of other seeds, as the glutenin from wheat, glycinin from the soy bean, globulin from squash seed, globulin from cotton seed, excelsin from Brazil nuts, and globulin from maize, or corn.[2]

### Grain Proteins

It has been found that an animal does not thrive if fed on a single cereal grain, even though the amount of protein be theoretically correct and the total food units be sufficient. This seems to be due, in part at least, to the fact that many of the grain proteins are incomplete. *This does not mean that grains are not good foods,* but simply that the diet must be varied enough so that incomplete proteins may be supplemented by complete proteins or with proteins supplying the missing links.

---

[2] Quoting from L. B. Mendel, who has done much work along this line: "When the gliadin of wheat, a prominent protein of this seed, is fed as the sole protein, adult animals are suitably maintained; but growing animals cease to increase in body weight, remaining in nutritive equilibrium without growth unless the amino-acid lysine is added to the gliadin food. Thereupon growth is promptly resumed. The explanation becomes apparent in the fact that gliadin is almost entirely devoid of the amino-acid lysine; and inasmuch as this is obviously needed for new protein construction, growth cannot proceed until the missing unit is supplied. Again zein, the most conspicuous protein of the maize kernel, fails to yield either lysine or tryptophane or glycocoll, and accordingly is entirely inadequate to meet the nitrogenous needs of the animals in respect to either maintenance or growth. It may be fed in the greatest abundance, yet the animals decline in health unless the zein is supplemented by some more perfect protein. If the amino-acid tryptophane is added to the imperfect maize, protein maintenance of body weight without growth is promptly established. . . . If both tryptophane and lysine are added to the zein, the diet thereupon becomes suitable for growth." — Journal of American Medical Association, Sept. 5, 1914.

### Combination Important

Two proteins, both incomplete, may be deficient in different ways so that the combination of two or more incomplete proteins may be sufficient to supply all the nitrogenous combinations and thus make a complete protein food.[3]

### The Protein of Corn

A single grain usually contains more than one protein, as, e. g., wheat with its gliadin, a protein that will maintain body weight, and its glutenin, one which will stimulate growth; and while zein, a prominent protein of corn, is unable to even maintain the body, yet corn also contains protein that is a globulin, which will maintain and even cause growth. If intelligently combined with other foods, corn is a valuable addition to the dietary. It, however, could not be depended upon as a sole source of protein. It is interesting to note that the protein of green vegetables will supplement the protein of corn or of any other cereal.

The proteins of meat, milk, and eggs have been found to be complete in themselves. Accordingly a diet of grains and milk is a complete food in so far as its proteins are concerned. Recent experiments have shown that the protein of the peanut and the soy bean are of very good character.

### Know Foods; Avoid Monotony

Again we would emphasize the need for a knowledge, by the vegetarian, of foods and their values, that the meatless diet may not prove to be a deficient one. A complete diet without the use of flesh food is very pos-

[3] The proteins of the pea or bean, when taken as the sole source of nitrogen, are of very low biologic value, and they will not supplement the protein of corn, though they improve the protein of wheat. Bean proteins will not supplement those of oats, though pea proteins and oat proteins are said to supplement each other.

sible and a great advantage, but care must be taken that intelligent combinations be made and that monotony be avoided. Green vegetables and fruits supply many elements lacking in grains, and with a knowledge of food values and an intelligent daily variation in foods served, one need be in no danger of limiting his diet to one deficient either in quantity or quality of protein. But how important that the housewife be educated along these lines and so be understandingly efficient as she carries on the important work of supplying the family table.

Following are grouped some of the more important staple protein foods in such a way as to show at a glance those having the highest proportion of the nitrogenous element.[4] With these, many attractive dishes may be prepared, and, as meat substitutes, supply the necessary protein.

### Class 1

Very high protein foods (foods of high total food value of which the protein is above 20 per cent).

| Food | Percentage of Protein |
|---|---|
| Beans, Lima | 21 |
| Beans, navy | 25 |
| Beans, kidney or pink | 28 |
| Beans, soy[5] | 32 |
| Buttermilk | 23 |
| Eggs | 33 |
| Cottage Cheese | 53 |

[4] The percentages of protein in these tables are of the total food values and not of the weight.

[5] Soy beans, introduced into the United States more than one hundred years ago, primarily for use as a forage crop, are in reality one of the most nutritious of the legumes when used as human food, according to specialists of the United States Department of Agriculture. . . . Since they furnish proteins and valuable fat, they are especially important to turn to as an emergency addition to the usual dietary or as a substitute for other foods furnishing protein and fat. Moreover, the fact that they contain no starch makes them valuable for invalids who cannot eat starchy foods.— Food Thrift Series No. 2, U. S. Department of Agriculture.

| | |
|---|---|
| Gluten meal or flour (40 per cent) | 40 |
| Lentils | 27 |
| Meat, lean | 33½ to 100 |
| Nuttolene | 29 |
| Peas | 25 |
| Protose | 46.5 |
| Skim milk | 37 |

### Class 2

High protein foods (foods with high total food value of which the protein is from 15 to 20 per cent).

| Food | Percentage of Protein |
|---|---|
| Bread, whole-wheat | 16 |
| Gluten meal or flour (20 per cent) | 20 |
| Granola | 15 |
| Granuto | 17 |
| Milk (whole) | 19 |
| Oatmeal | 18 |
| Peanuts | 20 |
| Rice (whole) | 16 |

### Class 3

Medium protein foods (foods with high total food value of which the protein is from 11 to 15 per cent).

| Food | Percentage of Protein |
|---|---|
| Almonds | 15 |
| Bread, rye | 14 |
| Bread, white | 13 |
| Bread, Graham | 14 |
| Cracked wheat | 14 |
| Cream of Wheat or Farina | 12 |
| Macaroni | 14 |
| Shredded Wheat Biscuit | 14 |
| Wheat flakes | 14 |

## CLASS 4

Foods with low total food value of which a high proportion is protein.[6] See Chapter IX.

| Food | Percentage of Protein |
|---|---|
| Asparagus | 32 |
| Beets | 24 |
| Cabbage | 50 |
| Carrots | 14 |
| Cauliflower | 55 |
| Celery | 24 |
| Cucumbers | 20 |
| Eggplant | 21 |
| Greens — beet, dandelion, etc. | 28 |
| Lettuce | 25 |
| Radishes | 18 |
| Spinach | 32 |
| String beans | 40 |
| Tomatoes | 21 |
| Turnips | 20 |

[6] Complete proteins, or proteins containing all of the tissue building stones, are found in the foods of Class 4 as well as in the outer layer of all other vegetables, the outer layer and germ of grain, and in milk, eggs, and meat.

*"Lack of balance of the food is a fault second only in importance to actual want of some essential ingredient."— McCarrison.*

## CHAPTER VII

### A BALANCED RATION (Continued) — FAT

#### A Concentrated Fuel

FAT makes up an important part of the dietary. It is fuel for the body in a concentrated form. It contains carbon, hydrogen, and oxygen, and, with the carbohydrates, furnishes heat and other energy[1] (see page 18) in its oxidation in the body.

#### How Much Fat?

Ordinarily, about one fourth to one third of the food supply should be fat, or from 600 to 800 calories. Under conditions where the body fires need to burn more brightly, as in cold climates or in excessive exercise, the body needs more fuel, and so can utilize and take care of more of this concentrated food.[2]

#### An Excess

However, the menu of the average family contains much more of this food element than the one third given as the normal proportion. Instead of 600 or 800 calories, the amount usually runs up to more than 1,000 calories. Four hundred to 600 food units of butter alone may be daily consumed by the one who, not realizing the need for a more nearly balanced ration, carelessly follows his inclination in this respect. When to this is

---

[1] The three common classes of fat are, stearin, palmitin, and olein. Stearin ($C_{57}H_{110}O_6$) makes up a large part of beef and mutton tallow, and having a higher melting point than the other fats, is in a solid form at ordinary temperatures. Palmitin ($C_{51}H_{98}O_6$) is found in human fat, in all animal fats, and to an extent in vegetable fats. Olein ($C_{57}H_{104}O_6$), having a low melting point and so in the form of oils, is found to a greater extent in vegetable fats, as in olive and cottonseed oils.

[2] Recent scientific investigation goes to show that of the vitamines essential for life some are soluble in fat, and of the fats included in the diet some should be in such form as to insure the provision of this valuable vitamine. (See Chapter IX.)

added the fatty seasonings in the other foods served, the normal fat content of such foods as olives and nuts, legumes and grains, cream and milk, the excess of fat not only tends to bring the total food ration far above the normal, but often overwhelms the digestive tract and tissues with an amount of fat far exceeding the ability of the body properly to utilize and eliminate.

### Average per Capita

Recent calculations show that the average consumption of fat per capita a day in the United States is 150 grams, which equals 1,350 calories daily. (See page 33.) While Hoover reports that during his two years' experience in Belgium the ration allowed contained 40 grams or 360 calories of fat, 60 grams or 240 calories of protein, and 300 grams or 1,200 calories of carbohydrate, making a total of 1,800 food units daily. This was found entirely sufficient for the entire population, except for adolescent children, for whom an extra allowance of fat was made. Surely the difference between the 360 fat units actually required and the 1,350 used by the American people represents a great excess in the use of this kind of food.

### Fat Free and Combined

Fat is supplied to us in two forms: free fat and combined. Combined fat is found in nuts, olives, grains, and legumes, especially the soy bean. It is also found in other vegetables and in some fruits, as the alligator pear. Fat is not found in nature as a free fat, but by mechanical processes can be isolated. So we have butter, oils, free animal fats, as suet, tallow, lard, etc. The fat of cream is in an emulsified form and is not a free fat until it is made into butter.

The fat-soluble vitamine (see Chapter IX) is found in milk, eggs, and butter, and also in leafy vegetables. In

this respect it becomes largely a question of quality rather than of quantity, and while vegetables cannot be said to supply fat to any great extent, yet they contain a sufficient amount to hold in solution this valuable vitamine.

Taking a hint from nature, it would seem that the plan was not for our food to contain fat in a free state, but in a form which could more readily mix with the digestive juices.

In the stomach an excess of free fat, by lubricating the food and thus preventing its mechanical action, hinders the flow of gastric juice and also interferes with the thorough mixture of the digestive fluid with the stomach contents.

### Digestion Hindered

All free fat must be thoroughly emulsified before it can be digested or before the digestion of other food elements can be accomplished. This process of emulsification takes place in the intestine, and until it is accomplished all digestion is to a greater or less degree hindered. This is particularly true of protein. The oily coating about the protein particles hinders the action of intestinal fluids on the protein, thus furnishing another factor in the causation of intestinal putrefaction and auto-intoxication. This stagnation also allows the fat itself to become rancid, producing products irritating to the mucous lining.

### Fat Metabolism

After fat is digested and absorbed, it should be completely oxidized into carbon dioxide ($CO_2$) and water ($H_2O$), with resulting heat production, and, as carbon dioxide and water, eliminated through the lungs, skin, and kidneys. If more fat is ingested than can be oxidized into $CO_2$ and $H_2O$, one of two things happens:

the excess is laid up as fat in the tissues with perhaps resulting obesity; or an attempt is made to throw off the excess in an imperfectly oxidized form, and again we have a "stove that smokes." (See page 20.)

### Fatty Acids

Fatty acids are combinations of carbon, hydrogen, and oxygen into which the complex fat molecule is broken up on its way to complete disintegration. To an extent they are formed normally in the process of fat digestion. Abnormally they are formed when fats become rancid either on the pantry shelf or in the digestive tract as the result of delayed digestion. The subjection of fats to extreme heat, as in frying, also results in the formation of fatty acids.

### Eczema, Pimples, Catarrh

If in connection with metabolism the oxidation of fats is incomplete, the process often stops at the fatty acid stage, and in this form the body seeks to eliminate them.[3] The excretion of these products of an imperfect metabolism takes place through the skin and mucous membranes, and, because of their irritating action, they increase the tendency of a susceptible skin to eczema, acne, pimples, boils, etc., and of the mucous membranes to catarrh.

This result is often made the more probable because of the accompanying intoxication resulting from the intestinal stasis (stoppage) brought on, or increased by the presence of a large amount of free fat in the intestinal canal.

### Frying

These conditions of irritation are increased if, before fats are eaten, they are broken up by heat into these

[3] This excess of fatty acids in the blood may be a factor in the production of a lessened alkalinity of the body fluids, often spoken of as acidosis. (See page 85.)

same fatty acids, as happens in most frying and cooking at extreme heat. This decomposes the fat so that it at once manifests its irritating properties as it reaches the delicate lining of the stomach; and at the same time the coating of fat which the food receives in frying greatly hinders the mixing of the gastric juice with the food particles.

### Quality of Fat

The amount of fat needed to supply caloric needs can be supplied the body in the form of olives and nuts, and in other combined forms, without the use of fat in a free state. As has been suggested, quality of fat must be considered as well as quantity, because of the fact that fat is an important vitamine carrier. An excess of refined oils cannot take the place of fat which still retains its fat-soluble vitamine. If a sufficient amount of fat-soluble vitamine is ingested, the need for additional fat varies largely with caloric needs. (See page 77.)

### Butter

Butter differs from refined oils in that it still retains the fat-soluble vitamine of milk. However, the milk supplies this vitamine freely, and, as has already been said, this vitamine is found in leafy vegetables. Therefore, with a diet including milk and leafy vegetables, the question of butter in the daily ration becomes one of caloric food value and personal taste. The advantage in fat as a food, *per se,* is in the fact that it furnishes necessary food units without undue bulk with its tax on the mechanical phase of digestion. However, as we have said, combined fats may accomplish this, in most cases quite as well as free fats. It is well that all food does not come to us in a bulky form; for by combining bulk with concentration in various ways, food combinations suitable for all types of individuals may be supplied.

The fat taken in olives can be utilized by the body to much better advantage than if taken as olive oil, and in the olive it is combined with mineral salts and protein. For those who need for a time an extra amount of concentrated food, cream may be taken with advantage, but this can easily be overdone.

### Vegetable Oils

It is a fact worthy of mention that the vegetable oils, especially olive oil, are not so quickly broken up into fatty acids as are animal fats, more particularly butter. Butter, being rather unstable, quickly becomes rancid and soon decomposes when subjected to heat. For this reason it is not ideal for the seasoning of cooked foods, and should be used carefully. This, with the fact that disease of animals is rapidly on the increase, makes the question of the free use of butter, one not only of economy, but also of health.

Whenever fat is used as seasoning, it is much better to add it after the food has been removed from the fire, so that it may not be subjected to intense heat. The addition of fat to vegetables greatly lessens their digestibility, and, if cooked properly, it is surprising how palatable such foods are without the addition of butter or oil.

### To Fry Without Grease

Instead of the excessive use of fats in frying, equally satisfactory results may be obtained by braising or broiling, using only enough fat to slightly oil the pan. Even an egg may be "fried" without grease by dropping it onto a perfectly smooth hot iron or aluminum skillet.

So then, the ideal in our dietetic program which is to make for health is, first to balance properly our daily fat ration; second, to eat the minimum amount of free fat; and, third, to eliminate, as far as possible, the use

of fried or greasy foods. With a little interest and care we shall find it possible, and quite as easy, to prepare our foods in a way that will yield results in added health, and, at the same time, satisfy the most epicurean taste.

Apropos of our discussion in this chapter, we quote a portion of an editorial in the *Journal of the American Medical Association*, March 5, 1921. The *Journal* would not wish to be quoted as advising a food intake too low in fat, as is indicated in the last paragraph of the quotation. Nor do we; our only plea is that more of the fat be taken in its natural combined form. The quotation, however, is of interest and will bear study. It suggests, at least, the possibility that fat in the amounts we have been accustomed to is unnecessary.

" Some of the physical ills which visited the underfed peoples of the war were charged to the shortage of fats in the ration. War edema serves as an illustration. Subsequent investigation has failed to justify most of these offhand conclusions.

**Psychologic as well as Physiologic**

" That fat is a potent food, is obvious from a consideration of its fuel value alone. A pound of fat yields two and one-fourth times as much energy as does a pound of any other nutrient utilized by man. This was the physiological justification for the slogan: ' Fats Are Fuel for Fighters.' A study of the dietary habits of different races at once suggests, however, that the apparent dependence of persons on fats may have psychologic or culinary motives as well as purely physiologic reasons. Thus, we are reminded that the Japanese, for example, habitually eat little fat. But it is the habit of both Europeans and Americans to use considerable fat, both on the table and in cooking. The taste of food is not so pleasing without it. Their recipes almost all call

for fat in one form or another, so that when little or none is available, a change must be made in most of the methods of cooking. Virtually all food must be boiled, and is lacking in the flavor and texture to which we are accustomed. The food, no matter how nutritious it may be, will not taste good. In other words, food without fat is likely to be without flavor and monotonous; and if a food is distinctly unpleasant and different from what a person is accustomed to, digestive upsets may result.

### An Important Query

"Accordingly, when those concerned with the nutritive welfare of the nation raised the query, 'How much fat do we need?' the reply was that 'it is impossible to say with definiteness.' The fact that there has been no available satisfactory information on this question is attributable to the experimental difficulties heretofore inherent in its solution. It is only in comparatively recent times that some of the essentials of an adequate diet have been discovered. Without knowledge of the importance of vitamines, for example, all earlier attempts to study the rôle of proteins, fats, carbohydrates, or inorganic components of the diet by feeding them in varied proportions as isolated substances, inevitably failed. A diet rich in fat might bring nutritive failure as readily as one poor in this foodstuff, the untoward outcome in either case being due to a neglected and unrecognized further factor in the food mixture. Again, the presence of fat in the diet might bring beneficial results because it was the chance carrier of vitamine A, associated with some fats more than others. [See Chapter IX.] Maignon supposed that fats assume an important rôle in the utilization of protein, a rôle that carbohydrates are powerless to fill. His experiments were conducted by feeding mixtures of more or less isolated food materials

without due consideration to the now well-recognized need of accessory food factors or vitamines.

"Recent controversies regarding the necessity for fats in the diet fail to emphasize adequately the distinction in the significance of fats as sources of energy and as carriers of vitamine and of lipoids, regarding the rôle of which we are still largely uninformed. Directing attention to the fats themselves rather than to the other food ingredients which commonly accompany them, Osborne and Mendel have succeeded in securing satisfactory growth from an early age to full adult size in experimental animals on rations extremely poor in true fats. The diets consisted of mixtures of proteins, starch, and inorganic salts, vitamines A and B being supplied by small portions of alfalfa and yeast. Such mixtures are not absolutely devoid of extractable fat, but the maximum of the latter amounted at most to a small fraction of 1 per cent of the ration. Hence Osborne and Mendel cannot avoid the conclusion that if true fats are essential for nutrition during growth, the minimum necessary must be exceedingly small. . . . Hindhede, whose results with young men correspond to observations on laboratory animals, has contended that fat is not required in the diet if a sufficient amount of fresh fruits and vegetables is eaten daily to supply vitamines. The striking facts here offered must not be accepted as an immediate dictum that dietary fats ought to be dispensed with, . . . nor do they demonstrate that well-being is not best promoted by the inclusion of a liberal quota of fats in our daily intake. They are physiologic facts with which the study of nutrition may henceforth deal."

*"Consider diligently what is before thee: and put a knife to thy throat, if thou be a man given to appetite."— Bible.*

# CHAPTER VIII

## CARBOHYDRATES; THEIR PLACE IN THE DAILY RATION

THE total food ration being kept near normal limits and fat and protein taken in proper amounts, the question of the proportion of carbohydrate obviously takes care of itself; but there are a few things in regard to this important fuel food that should be kept in mind.

### Cellulose

The great bulk of food is carbohydrate, one of the seven great food classes. To this class belong cellulose, starch, and sugar. Cellulose is not digested and serves merely as bulk, but when acted upon by strong acids, it may be changed from cellulose to starch; from starch, through the stages of dextrin and maltose, to glucose, the simple sugar which practically all digestible carbohydrate becomes before it is absorbed from the intestinal tract. (See page 60.) All plant fiber is cellulose, the woody framework of trees, and even cotton. A story is told of a man who took a dirty shirt which had been worn by a tramp, and, after washing it, put it through various processes which changed it from the cellulose which it really was, into glucose, from which he made a delicious confection. However, the digestive tract cannot digest cellulose, so it passes through unchanged, simply serving as a broom to keep the bowel clean and as bulk upon which this muscular tube can exercise itself.

### Starch

Starch is the form in which carbohydrate is first manufactured in the plant. Unripe fruit contains starch,

but as the fruit ripens, this starch is changed to sugar. This *fruit sugar* is made up principally of glucose or dextrose and a closely related sugar of practically the same chemical composition called levulose. In vegetables, starch is stored up in the plant, only a small portion of it becoming sugar. The carbohydrate of grains is mostly in the form of starch.

Sugar is found principally in fruits, honey, the sugar cane, the maple, and some vegetables, as the sugar beet. The important difference between starch and sugar is that starch must be changed into sugar during the process of digestion. The formation of *dextrin* is the first step in the process of changing starch into sugar. (See page 14.) *Maltose* is the next step. Maltose is formed in the malting of grains, during thorough mastication, and in the intestine, where the process of starch digestion is completed by action of the amylopsin of the pancreatic juice. Maltose is then changed into *glucose* in the intestine.[1] So in this process we have starch, dextrin, maltose, glucose.

The process of digestion completed, carbohydrate is absorbed in the form of glucose. It is then changed in the liver to a form called glycogen, and is dealt out to the body as it is needed.

### Sugar

The forms of sugar as we find them in various foods may be classified as (1) dextrin (the first step in starch digestion, as in dextrinized foods); (2) maltose (the second step in starch digestion, found in meltose, malt sugar, dextri-maltose, etc.); (3) glucose (the final step

---

[1] The chemical formula for starch is $(C_6H_{10}O_5)n$; for dextrin, $(C_6H_{10}O_5)n$; for maltose, $C_{12}H_{22}O_{11}$; for cane sugar, $C_{12}H_{22}O_{11}$; for dextrose, or glucose, $C_6H_{12}O_6$. The change from starch into sugar may be represented by the following chemical equation: $2(C_6H_{10}O_5) + H_2O = C_{12}H_{22}O_{11}$, or maltose. The change from maltose into the simple sugar glucose, is shown by the following: $C_{12}H_{22}O_{11}$ (maltose) $+ H_2O$ (water) $= C_6H_{12}O_6$ (glucose) $+ C_6H_{12}O_6$ (glucose), or two molecules of glucose.

in starch digestion, often called dextrose and found in fruit sugar); (4) levulose (see page 59); (5) galactose (or the sugar of milk and akin to glucose); (6) sucrose (cane sugar, the most complex sugar and found in the sugar cane, sugar maple, and sugar beet). In the process of digestion, cane sugar is changed, with other sugars, into glucose; levulose and galactose, being chemically the same as glucose, remain unchanged. Honey is a combination of cane sugar and fruit sugar.

In the tissues the oxidation of sugar produces heat and energy, and it is eliminated as carbonic acid gas ($CO_2$) and water ($H_2O$). Normally a certain amount of carbohydrate is changed over into fat and deposited in the tissues as reserve fuel. In this respect carbohydrate and fat differ from protein, in that protein cannot be stored as reserve for future use.

In cases of suboxidation due to lack of exercise, or where the food intake is in excess of body demand, this storing of the carbohydrate in the form of fat may become excessive and obesity may result.

## Diabetes

Diabetes is an abnormal condition in which the oxidation of sugar is interfered with, and sugar, instead of being used by the tissues, is dealt with by the blood as a foreign substance, and being eliminated by the kidneys as glucose, is found as such in the urine. This metabolic disorder is not well understood, but is probably due to some abnormality in the internal secretions which govern the oxidation processes. (See Chapter XXVI.)

The amount of carbohydrate food required by the individual depends upon body caloric needs. After the necessary 200 to 300 calories of protein have been assured, the amount of energy food required must be ap-

portioned between carbohydrate and fat. Because of the concentration of fat and the fact that its molecule is more complex than that of carbohydrate, and therefore not so easily digested and metabolized, it would be unwise to attempt to derive all energy material simply from fat.

### Bulk Versus Concentration

Carbohydrates in their natural form furnish bulk minus the concentration of fat. Therefore, if they form too small a proportion of the diet, the system may suffer from a handicap of dealing with too large an amount of concentrated food with its greater difficulty of both digestion and metabolism. The digestive tract is so constructed that it works better with food which furnishes considerable proportion of bulk. If fat were depended upon to supply this bulk, much more food would be taken than would be required, and because of the concentrated nature of fat, digestion would be well-nigh impossible. Because of the ease of the oxidation of the carbohydrate molecule, carbohydrates have been likened to the kindling which makes it possible for the body fires thoroughly to burn fat, the more concentrated fuel.

### Protein Sparer

Carbohydrates have also been found to act as protein sparers, i. e., under conditions where protein must be ingested in smaller quantities than normal, it is possible for the carbon, oxygen, and hydrogen of carbohydrates to unite with the outgoing nitrogen, which, having been used once, is on its way to be eliminated; catching it, as it were, they bring it back to do second duty. In this way the possibilities for the use of nitrogen under such circumstances, are doubled. Hence, while, under normal conditions, we need 400 to 600 calories of the more

concentrated food, the greater part of our food intake must ever be carbohydrate, say 1,000 to 1,500 calories.

The proper variation in these two types of energy food with different individuals is one of the points where a careful judgment in dietary planning is often needed. Some do better with more concentrated food and less bulk, while others may need to have a greater amount of their food value in a bulky form.

### In Natural Combination

In natural unrefined foods, starch is always in combination with vitamines, mineral salts, and, to some extent, complete proteins. These important associated elements are found in the hull of the grain in rice polishings, the skin of the potato, etc. (See Chapter IX.) As with starch so with sugar, we find all in natural combination with vitamines and mineral salts, including a goodly supply of lime, or calcium. We have seen that fat and protein are not supplied in nature in a free state. Natural foods are ever combined in the way most advantageous for body use.

Nature tends to avoid concentration, and ever associates with foodstuffs small quantities of very active substances which help to bring into play the mechanism that makes it possible for the body to use these foods to the best advantage. We find, however, in civilized countries, as a result of refining processes, these accessory elements largely removed; so, instead of honey, with its associated vitamines and lime salts, instead of fruit sugar as found in fruit, man depends almost entirely upon the refined form of cane sugar for the satisfaction of his desire for sweets. We find him taking, as he does his fats, much of his starch in refined, concentrated form, such as white bread, polished rice, and the potato from which the outer covering has been removed. (See page 101.) This gives

him a preponderance of carbohydrate without its associated means for stimulating normal digestive and metabolic processes. This is therefore the reason for the recognized difficulty attending the digestion of so much starchy food. It is not only concentrated, but devitalized, and cannot be well handled by the digestive tract.

Starch requires more digestion than sugar, as it is in a more bulky form, thus increasing the strain on the mechanical phase of digestion, and, chemically it must be changed into sugar before absorption. If this tax is placed upon the digestive powers without the normal attending vitalizing elements, small wonder that fermentation results, with the formation of gases and irritating acids.

### Carbohydrate Fermentation

Fermentation of carbohydrate in the digestive tract, as well as the results of incomplete metabolism, draws upon the alkaline resources of the body, often causing a tendency to acidosis, so called. This is especially true when large amounts of devitalized, starchy food is taken, or when concentrated cane sugar is ingested in more than very moderate quantities.

Says Sir James Barr, M. D., of England: "An excessive amount of acid, whether taken by the mouth or generated by the fermentation of carbohydrates in the stomach, would extract the lime salts from the bones, cartilages, fibrous tissues, and nerves. The acid fermentation of an excess of carbohydrate will saturate the free calcium ions, and even dissolve the calcium already deposited in the tissues." (See Chapter X.)

### Moderation Important

This discussion may help to make clear the reason for the rather bad reputation that so-called starchy food has

acquired in the minds of the people. There are many who have learned that starches do not agree with them. Just why, they do not know, and various diet enthusiasts think to solve all dietetic problems by an endeavor to greatly restrict the use of starchy foods or even to eliminate them entirely. So we hear of "starch poisoning," of the harm of taking "two starches at a meal," that "potatoes should never be eaten," and even that our old stand-by, bread, is "the staff of death." Most of these people have a very vague conception of food values. They do not know that of necessity starch must have an important place in the food ration of man, and that the trouble is not with starch as a food, but with the devitalized, demineralized form in which it is taken and in the unbalancing of the daily ration by letting excessive carbohydrate crowd out necessary protein. They do not realize that actual bulk of food must be considered as related to the mechanics of digestion; that foods containing starch — such as bread, potatoes, rice, cereals, legumes — furnish, as compared with such foods as fruits and vegetables, a concentrated mass which, if taken in excess, handicaps digestion in both its mechanical and its chemical phase — mechanical, because of the difficulty with which the muscular walls work over this concentrated mass; and chemical, because of the length of time it may take the digestive juices to penetrate the center of it. Moderation should be exercised in the eating of any class of foods, whether starch, sugar, fat, or protein, as overeating of any food is bad, including, of course, foods containing starch.

So let these foods, which are so important and yet against which so much has been said, be eaten only in proper proportion; let them be combined freely with foods that supply bulk in a lighter, less concentrated form, as green vegetables both raw and cooked, salads,

fruits; and by all means let them be taken in natural combination as intended for us by nature. We shall then choose Graham and whole-wheat bread, whole-grain cereals, brown rice; and in preparing vegetables we shall remember the value of the salts and vitamines just under the skin and in the leaves. Let it be remembered that no two digestive tracts are able to do exactly the same work, and that with a knowledge of the underlying principles, all rules must be modified to suit the individual.

Undoubtedly many people eat too much bread, cereal, and potato; too large a proportion of these foods are in their diet, with not enough of the foods supplying complete protein, mineral salts, and vitamines. They are either overeating or their carbohydrate food is crowding out necessary protein. Let these matters be adjusted, and starch be given its proper place as an important and necessary article of food.

### Cane Sugar

Another devitalized, demineralized, concentrated food taken in great excess by civilized peoples is cane sugar. In spite of the abundance of the natural predigested sugar of fruit, it is in the form of cane sugar extracted from its various sources, and served often in its concentrated form, that a large part of sugar is ingested. In its concentrated form cane sugar is very irritating to the mucous membrane, very marked inflammatory effects being produced when solutions stronger than 6 per cent to 10 per cent are taken. Yet it is in this form that millions of pounds a year are consumed by the American people, and to this excess may be ascribed another cause for various digestive troubles, to say nothing of an excessive fuel supply in its effect on metabolism. This also adds to conditions of fermentation in the

digestive tract, with a formation of acids which, as we have seen, tends to produce conditions of acidosis. In nature, sugar is always combined with lime. If extracted from the lime and taken in a refined form, it draws upon the lime reserve of the body, and, as we have quoted, may even dissolve the calcium already deposited in the tissues. As calcium salts are among the important alkalizers of the body fluids as well as important structural elements in the formation of such tissues as the teeth and bones, we can see a reason for the well-known deleterious effect excessive candy eating has on the teeth of children, and for the frequency of rickets in babies on a diet supplying a preponderance of sugar, as in certain proprietary infant foods.

### The Sweet Tooth

Children are educated from babyhood to like sugar, and " the sweet tooth " so universal among them is more often a result of wrong training than a natural instinct. These children are often fat and apparently well nourished, but their vital resistance in many cases is low, and they may be among the first to succumb to infection and disease. The susceptibility of the child to colds, catarrh, adenoids, enlarged tonsils, croup, bronchitis, is often greatly increased by this error in diet, with an excess of fats and greasy foods. Wise is the mother, who, knowing this, feeds her child in such a way that the foundation for chronic catarrh, digestive troubles, and metabolic disturbances is not laid.

### Cane Sugar Formerly Not Used

We quote from Dr. Kerley, of New York:

" Cane sugar was not cultivated until three hundred years ago, and as late as the tenth century it was used largely as a condiment as honey is used at the present

time. Countless millions existed and lived their span without it. Now we require forty pounds[2] a year per capita. It requires no great strain on the imagination to believe that the introduction of so large an amount of highly energized food in excess of demands might produce ailments of a very definite character. It is noteworthy that, as the refined product came into common use, it was first employed only on medicine 'to render unpleasant and nauseating drugs grateful to the sick.' Gradually sugar was found of value in preserving fruits, and then added to tea, wine, and various beverages, until its acceptability as a food for the sick and its value as a source of energy in sustaining artificially fed infants came to be appreciated. Then only (about 1600) was the substance commonly recognized as a food. What the result has been cannot be better summarized than in the words of Moseley, written in 1800:

" 'Two centuries have elapsed since it can properly be said that sugar has become an ingredient in the popular diet of Europe. Such is the influence of sugar that once touching the nerves of taste, no person was ever known to have the power of relinquishing desire for it.' "

We quote also from Fitch, in "Dietotherapy," Volume II, page 766:

"It will be observed that Mendel appears skeptical as to white sugar being of any great nutritive value, but does not comment on the cream-colored product.

"Campbell . . . propounded as iconoclastic opinions with regard to the food value of sugar as he propounded concerning milk. He stated that we could get on very well without sugar at all. Primitive man had none but the limited quantity furnished by wild honey. War prices are exorbitantly high, and it consequently behooves every one to be economical. He maintained

[2] This is now ninety pounds a year.

that all money spent on candy is worse than wasted, and recommended that none should be so spent, that the money saved in this way should be loaned to the state, and that the multitude of persons engaged in the sweet industry should be transferred to occupations more profitable to the country.

"More than one well-known physiological authority has stated that sugar is not a natural food, inasmuch as the human economy is constructed to convert carbohydrate, e. g., starch, which they claim to be a natural foodstuff, into sugar. It is certain that if sugar were tasteless or not sweet, it would not be so popular as it is, and thus it must rank as a condiment as well as a food. It is interesting to recall that sugar was scarcely a commercial commodity a little over a century ago, and that before that our ancestors got on very well without it, while, as a matter of fact, a big section of the community consumes nowadays very little or none of it. The history of starch in the dietary, on the other hand, goes back to the very beginning of things, and there was a supply of starches long before sugar was thought of in its present form.

"Custom and cheapness have brought sugar into wide use, but in time of war its employment in many extraneous and totally unnecessary ways should be prohibited. After all, diet is largely ruled by custom, and war has gone to show that many customary articles of food which were considered essential by the public cannot only be dispensed with, but be dispensed with to the benefit of the general health."

*"Many things sweet to taste, prove in digestion sour."— Shakespeare.*

# CHAPTER IX

## VITAMINES

"It has thus far been shown that nutrition means fuel for the machinery, new parts with which to repair the machine, and minute quantities of 'vitamines' which produce a harmonious interaction between the materials in the food and their host." — *Lusk.*

### Ferments of Life

"Vitamines are ferments of life, substances without which a food does not keep one healthy, even though on a balanced ration." — *Evans.*

Funk says: "Vitamines are mother substances of digestive ferments and of body hormones as thyroid secretion and other internal secretions. Food may be ever so nourishing, but if without vitamines, the body cannot construct its own ferments and carry on its own vital activities."

The word "vitamine" is no longer new, and is so commonly used that nearly every one at all interested in foods has an idea of its meaning. We have already used it with little explanation and believe that few are in the dark as to its significance. However, its interest and importance is such that a little time spent in a more detailed study of these vital elements would seem quite worth while, if not necessary.

### Beriberi

Years were spent in investigation before it was found that beriberi, a disease of the Orient, could be cured and prevented by the addition to the diet of the nutritive elements ordinarily thrown away in the polishings of rice. Just what these nutritive elements were was not

understood, but the fact remained that a diet of polished rice resulted in symptoms of beriberi, while a diet of the unpolished grain was sufficient to prevent any manifestation of the disease. In Java, where the people lived largely on whole rice, beriberi was unknown.

### Scurvy

For years it has been a recognized fact that sailors living on canned and preserved foods sooner or later contract scurvy, but that this disease is speedily cured by the addition to their diet of fresh vegetables or the juices of fruits, especially the orange and the lemon. In 1535, when all but three of Cartier's 110 sailors had scurvy, he cured them all by giving them a decoction of fresh pine needles.

Babies fed on Pasteurized milk often contract infantile scurvy, but may be cured in a remarkably short time by the addition of orange juice to their diet. Potato water and other vegetable broths may be given these babies with the same beneficial effect, the symptoms of scurvy rapidly disappearing. When fed on oats or barley only, guinea pigs die from scurvy, but if the grain is moistened and allowed to sprout, which practically converts the grain into fresh vegetables, the disease is prevented.

### Pellagra

Pellagra, a disease of the Southern States, manifests itself largely among a class of people living on a monotonous diet of corn bread, bacon, biscuit, and sirup. Goldberger's experiments in the State penitentiary in Mississippi, showed that many cases of pellagra resulted when the inmates were kept upon a diet of white flour, grits, cornmeal, fried mush, brown gravy, sweet potatoes, coffee with sugar, and sirup. The introduction of oatmeal and fresh vegetables practically eliminated the pellagra.

## A Restricted Diet

"The regular diet of thousands of the poor people of the Southern States during the winter contains little besides corn bread, molasses, and a small amount of salt pork. After three or four months of such a diet, large numbers of them develop pellagra. That the cornmeal which is eaten has in itself nothing to do with the production of pellagra is evident from the fact that the disease occurs with those who have not eaten corn products in the period preceding the attack. Corn rightly used is a wholesome foodstuff, and there is no warrant for the belief sometimes expressed that it is the cause of pellagra. It is the restricted character of the diet, which is undoubtedly rendered unsatisfactory by several factors operating simultaneously, not corn or any other single food, which causes the disease. When the character of the diet is improved by doing away with an excess of alkali (baking soda) in cookery and by the introduction of a wider range of foods, . . . many of the milder cases of the disease recover." — *"Ten Lessons of Food Conservation," U. S. Food Administration, pp. 50, 51.*

## Deficiency Diseases

No matter how plentiful in "calories" the diet is, it became apparent that there might be a deficiency elsewhere with disastrous results to the body, hence the term "deficiency disease." Unmistakably beriberi and scurvy come under this head, and the above observations strongly suggest that pellagra is also a deficiency disease. There are some investigators who believe that a predisposition, at least, to rickets in children, to eczema, and even to such infections as tuberculosis and pyorrhea, may result from a diet deficient in certain vital elements.

### Pyorrhea

Dr. A. S. Gray says that pyorrhea is the "result of lowered vitality from lack of those organic compounds other than the proteins which Casimir Funk and other investigators prove to be present in fresh vegetables and in lime and other fruit juices, small quantities of which are absolutely essential to growth and health." Gray also says: "A diet largely composed of sterilized milk, corn flours, starch, and sugar, or of any foods subjected for a long period to a temperature above 250°, may be considered vitamineless and will predispose to tuberculosis, beriberi, pellagra, rickets, scurvy, osteomalacia, etc."

### A Vital Substance

Casimir Funk, working along this line, perfected some experiments that resulted in added light being thrown upon this most interesting subject. He was able to produce experimental beriberi in pigeons by feeding them for three weeks on polished rice. Then if they were fed the polishings from this same rice they were cured of their symptoms in a remarkably short time, showing that in the rice polishings were certain elements absolutely essential to life. What could this vital substance be?

### A Rapid Cure

By a series of experiments he finally isolated from the rice polishings a minute crystalline substance, of which two pounds of rice polishings yielded about one half a grain. Injecting under the skin or into the crop of a dying pigeon three tenths of a grain of this crystalline material was sufficient not only to make it well in a few hours, but also to keep it so for two weeks while on a diet of polished rice.

### Vitamine

This precious crystalline substance, which contained nitrogen, Funk called vitamine from "vita," meaning life, and from "amine," a nitrogenous chemical compound closely related to the proteins.

Besides this vitamine which so remarkably prevented beriberi and which Funk called the beriberi vitamine, he also isolated a vitamine seemingly having an especial action in the prevention of scurvy, or the scurvy vitamine.

### Three Important Vitamines

Moreover, experiments by Dr. McCollum and others have shown that animals do not grow and develop properly unless, to a diet which furnishes simply calories of protein, fat, and carbohydrate, there is added other food such as butter fat, egg yolk, or green leaves. These furnish an indefinite something which induces proper use of the caloric intake with normal growth and development. There seems to be a definite vitamine, in addition to the beriberi and scurvy vitamines, which has an especial action in inducing proper growth. The first two seem to have to do with the maintenance of the body in health; the last with the building of new tissue. The first two are soluble in water and are designated respectively water-soluble B and water-soluble C. The growth-producing vitamine is soluble only in fat and is called fat-soluble A. While all need water-soluble B and C, children particularly require fat-soluble A.

### If Fat-Soluble A Lacking

Young rats, deprived for a few weeks of the fat-soluble A, develop a severe inflammatory condition of the eye, which destroys the sight unless this vitamine is added to the diet, whereupon the eye condition returns to normal. Eye conditions analogous to this have been

found in warring countries where children have been for some time on a diet devoid of this vitamine. Many consider that rickets is due to a deficiency of the fat-soluble vitamine, together with some disturbance in the calcium-phosphorus metabolism.

### All Body Organs Affected

Since a sufficient lack of any particular vitamine will produce symptoms of some definite disease, as scurvy, it is reasonable to suppose that a lesser deficiency, even though slight, in one or more vitamines may bring on varying conditions of lowered vitality and poor nutrition not attributable to any disease, and the cause often be unrecognized.

The following from Dr. W. H. Wilcox, in the British *Medical Journal*, July 31, 1920, is of interest:

" The extremely interesting and important researches of Lieut. Col. R. McCarrison have shed quite a new light on the influence of vitamines in nutrition, and our conception of the action of these accessory food factors has become greatly enlarged in consequence. It appears that vitamines have a wide-reaching influence on all the organs of the body, and that the functions of the endocrine glands, of the gastro-intestinal tract, the heart and nervous system, etc., are powerfully affected. Absence of vitamines in the dietary of an animal causes marked changes in practically all the bodily organs; thus colitis, enterocolitis may be early symptoms, and marked changes may occur in the suprarenal glands; for example, if the dietary is deficient in antiscorbutic or antiberiberi vitamines.

" It seems certain that these views are applicable to clinical medicine in man. In cases of malnutrition, whether due to a defective diet or to some chronic disease, such as sprue, chronic colitis, dysentery, etc., it is

most important that the dietary should be . . . especially selected from the point of view of high vitamine value. . . . It must be remembered that vitamines have not only important action on the general nutrition of the body, but they also have a reaction on the functions of the important secretory glands; and when these functions are impaired, . . . a diet rich in vitamines will have a markedly beneficial effect in stimulating the repair of the damaged organs and their impaired functions."

### A Battery

Much has yet to be learned in regard to these life-giving substances, and whether or not they are "amines" is still a debated question, but the experiments by Funk and other investigators have given evidence quite sufficient to help us materially in planning a diet that will completely supply the body needs. In addition to a sufficient diet as regards the caloric value of our food, it is quite as important that daily we obtain in some way an adequate amount of vitamine, the battery, as it were, which keeps in operation the vital processes of the body, and makes possible a utilization by the body of food materials.

### Vitamines as Related to Protein

Just what may be the relation of vitamines to the proteins is as yet not fully determined. Funk called attention to the fact that on a diet composed largely of carbohydrates, more vitamines seemed to be needed by the body than when a large amount of protein is taken. This is undoubtedly due in part at least to the fact that much of the carbohydrate is taken separated from its natural setting (see Chapter VIII), without its vitamines and salts. Protein foods, however, are more often combined with vital food accessories. At any rate, though

all need an ample supply of vitamine food, yet the vegetarian and the one living on a low-protein ration seem to need even more an abundant supply of these ferments of life. It has been suggested that the protein with its nitrogen content can to an extent take the place of the vitamine when this is for any reason deficient, and that, vice versa, the vitamine can supplement a deficiency of protein. It seems that an individual on a diet containing a large amount of vitamines can do well on a much lower protein diet than one in whose daily ration the vitamine content is low.

It is a fact not without significance that many foods containing vitamines, e. g., the leafy vegetables, contain also a definite amount of protein of a most excellent quality as well as a good supply of mineral salts. Just where conditions apparently due to a lack of vitamines may be combined with, and overlap, symptoms referable to a deficiency in mineral salts and complete proteins, is a debatable question. The experimental investigations conducted have quite conclusively shown, however, that the supplying of missing protein links [1] and refined mineral salts is not sufficient for normal body maintenance and development unless, with these, are furnished the vital elements as classified above.

## Foods That Are Alive

What foods, then, contain vitamines? This is the practical question. All raw foods contain them, as raw

[1] By "links" is meant the amino acids which are united to form proteins. Proteins are very complex compounds consisting of many simpler compounds (amino acids) linked together. There are some eighteen of these amino acids. Some proteins lack one or more of the amino acids, and so are not complete proteins. When proteins are digested, they are broken up into their separate amino acids. These are absorbed into the blood and are there built up into such proteins as the body needs. If any of the necessary amino acids are lacking, the body cannot build its proteins. The proteins of all seeds (grains, legumes, nuts) seem to be lacking in certain of the amino acids. But the proteins of the leaves of plants and the proteins of milk contain these missing amino acids, and when used in sufficient quantity, they serve to make up the deficiency of the seed proteins. For this reason the cereals (including bread) should be eaten in connection with either green vegetables or milk, or both. Meat will also make up the deficiency, but for reasons explained elsewhere we do not advise its use.

fruit, raw vegetables, raw milk, raw meat; also all fresh vegetables properly prepared and not overcooked. The leafy vegetables are very rich in all vitamines.[2] Young carrots have been found to be rich in all classes of vitamines. All whole cereals, raw or cooked at not too high a temperature, as in a double boiler or, better still, in a fireless cooker, contain vitamines. Vitamines are present in the outer layer and in the germ of grain, and they are abundant just under the skin of vegetables and in fruits. They are also present in brewer's yeast.

Water-soluble B and water-soluble C vitamines are rather more widely distributed than the fat-soluble A. This last is found in foods containing fat. As it has to do with development of the young, it is abundant in all animal foods intended by nature to nourish the young, as the fat of milk, the yolk of the egg. It is found in glandular tissues of the animal body, the cells of which are continually reproducing themselves, as in the liver. Therefore a reason for its abundance in cod-liver oil, long considered almost a specific in many nutritional diseases of childhood. However, it is possible to obtain it directly from plant foods. It is found in the germ of grain and in leafy vegetables, in young carrots, tomatoes, and even in orange juice. These all contain enough fat to hold in solution necessary amounts of this

---

[2] The following is quoted from Dr. Graham Lusk as given in an address at the Auditorium, National Museum, Washington, D. C., Aug. 30, 1917: "Two Italian scientists describe how this class of people (Italian peasants) live mainly on cornmeal, olive oil, and green stuffs, and have done so for generations. There is no milk, cheese, or eggs in their dietary. Meat in the form of fat pork is taken three or four times a year. . . . Little wonder that such people have migrated to America, but it may strike some as astonishing that a race so nourished should have become the man power in the construction of our railways, our subways, and our great buildings.

"Dr. McCollum will tell you that the secret of it all lies in the green leaves. The quality of the protein in corn is poor, but the protein in the leaves supplements that of corn, so that good result is obtained. Olive oil when taken alone is a poor fat in a nutritive sense, but when taken with green leaves, these furnish one of the peculiar accessory substances, commonly known as vitamines, which is present most abundantly in butter fat, and gives to butter fat and to the fat in the whole milk its dominant nutritive value. The green leaves also furnish another accessory substance which is soluble in water and which is necessary for normal life. Furthermore, the green leaves contain mineral matter in considerable quantity and in about the same proportions as they exist in milk."

important substance, and, for this reason, are invaluable as aids in the feeding of children. Foods containing the fat-soluble A invariably contain the other vitamines as well.

### Foods That Are Dead

Vitamines may be destroyed by overheating or drying, or may be removed from the food in the process of preparation. Dried, preserved, and commercially canned foods are generally vitamineless, an exception to this being the canned tomato, the acid of which seems to stabilize its vitamine. In all processed grains, as white flour and polished rice, the vitamines have been removed. The vitamines remain in the outer, coarser portion and are often fed to stock, which thrive on "shorts," the part of the grain discarded by the human animal. All refined foods are vitamineless, as, e. g., cane sugar, refined oils, etc. It is said that pellagra, which is on the increase in America, is more acute and fatal here than elsewhere because of the superior machinery used in the processing of food. "Food is too much refined, too much polished, too much cooked, too much dried."

Just how much ordinary home cooking destroys the vitamines is a question, and no doubt varies greatly. (See page 107.)

### Some Vitamines More Stable

In the paring of vegetables many vitamines are lost; in the boiling, most of those remaining pass into the water, which is usually thrown away. Vitamines are destroyed by baking powder and soda, a strong argument against the use of these powders in the cooking of vegetables and the baking of bread. Vitamines are more stable in some foods than in others; e. g., raspberry juice can be boiled one hour without losing its vitality, while lemon or lime juice can be boiled and kept

indefinitely without becoming devitalized. As has been said, tomatoes, even though canned, retain their vitamines indefinitely.

### A Danger

Individuals with weak digestive organs, unable to digest bulky food, are often in danger of living on a vitamineless diet because their vegetables are puréed, their cereals are processed, often in the form of gruels with the coarser particles removed, or much of their food is dextrinized, superheated, their bread twice baked, and fruits perhaps eliminated entirely from their diet. But plans should be laid for these persons as well as for all others, that in their daily ration may be supplied these vital substances upon which the body is so dependent. For these persons it should be remembered that broths prepared from vegetables without removing the skins, are very rich in vitamines.

### A Safe Course

Our safety then lies in keeping close to nature, in eating freely of fresh fruits and leaf vegetables,[3] raw vegetables plain and in salads, in saving and using vegetable broths, in replacing fine, white flour bread with wholewheat and Graham bread, in the eating of grains still

[3] The dietetic value of the leaves of plants (leaf vegetables) as compared with that of the seeds (grains and legumes) has been conclusively shown by the experiments of McCollum, Simmonds, and Pitz. The seed of the plant is its storehouse, and aside from the germ, contains no living matter. The seed, while rich in caloric food value, has a protein of relatively poor quality; it is low in inorganic salts and is deficient in the fat-soluble vitamine. The leaf of the plant is made up largely of living cells. It is the active respiring portion, the laboratory of the plant where starches, fats, and proteins are built up. This part of the plant supplements the nutritive shortcomings of the seed. We quote from McCollum: "From the results of experiments just described it was necessary to conclude that the leaf differs from the seed in that it contains in satisfactory amounts the dietary factors which are found in the seeds in too small amounts. These include the three inorganic elements, calcium, sodium, and chlorine, the fat-soluble A, and a protein supply which supplements, at least in some degree, the proteins of the seed. These, it will be remembered, are the three and only purified food factors which need to be added to each of the seeds singly in order to make it dietetically complete. It is therefore possible to devise a diet which is derived entirely from vegetable materials which will produce normal growth and the optimum physiological well-being." — "The Newer Knowledge of Nutrition," p. 64.

retaining all their food elements, as brown[4] rice, oatmeal, whole wheat, and unbolted cornmeal, and withal to vary the diet, avoiding a monotony in the food supply.

### For the Children

Especially should these things be borne in mind in the feeding of children. The importance of this cannot be overestimated. Children must have a varied diet of whole cereals, fruits, and a liberal supply of green vegetables and vegetable broths. These with milk will in most cases supply their dietetic needs, with an abundance of the fat-soluble vitamine as well. (See Chapter XXI.)

### Do Not Starve While Feasting

Many things contain vitamines, and while some of the foods in our daily ration may necessarily be devoid of them, with a little careful planning it will be found a very easy matter to add a sufficient quantity of foods rich in vitamines that the supply may be a liberal one. We need food for calories and for vitamines as well, and it is important that we remember the danger of "starving while feasting." Obedience to all other laws of hygiene and dietetics will avail one but little if one lives continually on a devitalized diet.

We quote again from Dr. A. S. Gray: "The wise man takes no chances and simply sticks close to nature. This means eating simple, properly prepared, unprocessed foods."

---

[4] The rice grain as it comes from the threshing machine, is incased in a husk, or hull, very much like barley. It is then known as "paddy." When the husk has been removed, it is called "pearled rice," or "brown rice," because of the brown gluten coating found just under the husk. The next milling process removes this brown coat, when the grain becomes "milled rice," which is then separated into various grades; the finest grain, being given a coating of glucose and talc, is then known as "polished rice." Brown rice as used here should not be confused with "browned" rice, as used on pages 115, 237, 294.

# CHAPTER X

## MINERAL SALTS

A VERY important part of the body structure is the mineral matter that enters into it. The ash of the body consists of chlorides, phosphates, sulphates, carbonates, fluorides, and silicates of potassium, sodium, calcium, magnesium, and iron. Iodine occurs also in the thyroid gland. In the body fluids, the principal organic salts are sodium chloride, sodium carbonate, and sodium bicarbonate, sodium phosphate, potassium chloride, potassium sulphate, calcium chloride, and calcium phosphate.

### Everyday Names

Some of these chemical elements are known by more common names, as potash for potassium, soda for sodium, lime for calcium, and magnesia for magnesium. In common phraseology we hear of carbonate of potash instead of potassium carbonate; of phosphate of lime instead of calcium phosphate. It is interesting to know that the term " potassium carbonate " is but the chemical name for lye, as " calcium carbonate " is for chalk, limestone, and marble; that sodium chloride is our familiar table salt; sodium bicarbonate but another name for baking soda, and sodium carbonate synonymous with washing soda.

### Functions Many and Varied

Lime salts in the form of calcium phosphate make up the principal part of the bones and teeth. Mineral salts enter into the composition of the blood and are found in all secretions and excretions. It is the presence of min-

eral salts in right proportion that maintains the proper chemical reaction of all body fluids and secretions; that keeps the blood alkaline, the gastric juice acid. It is the presence of mineral salts that maintains conditions of normal osmotic pressure, a proper rate of absorption in the digestive tract, and necessary interchange of all body fluids. The normal solvent power of the blood is also made possible by the presence of these inorganic elements.

*Calcium* salts are not only found in the bones and teeth, but are an important constituent of the blood itself, where their presence helps to regulate the power of the blood to coagulate properly. Calcium salts are essential to all cellular growth and development, and are an important factor in governing the normal contractility of muscle.

*Magnesium* salts occur largely in the skeleton, but also in the soft tissues and fluids of the body.

*Iron* is an essential element of the hemoglobin of the red blood cells, and thus plays an important part in the body processes of oxidation, secretion, and development. It is well known that iron is necessary for red blood; hence the popularity of the "iron tonic."

*Phosphorus,* as phosphates of potassium and calcium, enters into the structure of all body cells and is especially abundant in the bones and in the central nervous system. In combination with sodium as disodium phosphate, it aids in maintaining the normal alkalinity of the blood. (See page 85.)

*Sulphur* enters the body as a part of the protein molecule, and is the source of the sulphuric acid formed when the protein molecule is broken down. (See page 85.)

*Sodium,* in combination with chlorine as sodium chloride, forms 60 per cent of the salts of the blood, and enters into the structure of all the tissues and secretions

of the body in greater or less degree. In the form of the bicarbonate, sodium plays an important part in the maintenance of normal blood reaction.

While sodium salts predominate in body fluids, the cellular and soft solid tissues are especially rich in salts of *potassium*. Potassium chloride is an important salt of muscle tissue.

*Chlorine* is found in the body principally as the chlorides of sodium and potassium.

The contractility of muscle is affected not only by calcium salts, but also by the salts of sodium and potassium. It is necessary that the blood contain all these salts in proper proportion, in order that there may be the right relationship between muscular contraction and relaxation. The three remaining chemical elements mentioned in Chapter I, and not already discussed, are present in the body in very minute quantities.

No one mineral salt is limited to any certain class of body structures (unless it be the iodine of the thyroid gland), but all take part in a greater or less degree in the formation of all tissue, so the entire body suffers when there is a lack of any particular element.

### If Mineral Elements Are Lacking

It is quite evident, then, why the food ration should include a goodly amount of mineral matter. The bones and teeth of a child soon suffer from a lack of lime salts in the food. An incomplete supply to the bony structures of calcium and phosphorus in proper proportions is undoubtedly a factor in the causation of rickets. The blood soon shows the effect of a lack of iron. Cellular tissues, particularly, suffer from a lack of phosphorus, sulphur, and potassium; the blood and secretive processes from an incomplete supply of sodium and chlorine.

### Salts — Neutral, Acid, or Alkaline

Perhaps the most important phase of the relation of mineral salts to the conduct of the body functions is in the maintenance of a normal degree of blood alkalinity. It is well known that acids are sour, as, for example, hydrochloric acid, citric acid, acetic acid; that alkalies are soapy, caustic, as caustic potash, soap, lye. Acids and alkalies in the right proportion neutralize each other and form harmless neutral salts. Every salt is a combination of an acid with an alkaline element. Alkalies are also spoken of as basic elements or bases. If the basic element predominates, or is stronger, an alkaline salt is the result. If the acid element is greater, the result is an acid salt. So in addition to neutral salts we have alkaline salts and acid salts. Sodium carbonate (washing soda) and sodium bicarbonate (baking soda) are alkaline salts. The one is more alkaline than the other because it contains twice as much of the strong basic substance, sodium. The acids of fruits are in the form of acid salts — that is, salts containing less of the basic than of the acid element; for example, sodium acid citrate of citrous fruits.

### Alkalinity, Life — Acidity, Death

It is not quite so commonly known, however, that it is necessary for animal life that the body cells be continually bathed in a mildly alkaline fluid. Thus, we find the blood maintaining a degree of alkalinity equal to a definite proportion of sodium bicarbonate. In fact, it is the presence of sodium bicarbonate itself in the blood that maintains this constant reaction. In the animal body waste, decomposition and death ever result in acid formation. Constructive processes, repair, and life mean a preponderance of alkalinity. Balance in favor of alkalinity means life; in favor of acid means death.

## How Acids Are Formed

Acids are formed in the body in various ways. They are formed in a greater or less degree from all body wastes. As already suggested, they result from decomposition in the digestive tract, and oxidation processes in the tissues. Muscular contraction results in the formation of iso-lactic acid. Interference with oxidation or elimination increases the acid content of the blood.

But the greater part of the acid is produced in connection with the metabolism of protein. This acid is in the form of sulphuric acid. Eighty per cent of the sulphur taken in as part of the protein is converted into this acid. This must at once be neutralized, for sulphuric acid even in small concentration would be very injurious to the cells.

## How Neutralized

The exact chemistry of neutralization is not fully understood, but for those interested in chemistry, we give the following as illustrative of what probably occurs. Alkaline carbonates, e. g., sodium carbonate, react with the sulphuric acid, giving as a result sodium sulphate and carbonic acid ($H_2SO_4 + Na_2CO_3 = Na_2SO_4 + H_2CO_3$). The strong base, sodium, uniting with the strong acid, sulphuric, is neutralized, and the weak acid, carbonic, is formed from the slight acid excess. The resulting carbonic acid, carried to the lungs, is eliminated as carbon dioxide ($CO_2$).

The blood also contains disodium phosphate, a salt of phosphoric acid, and alkaline, because it contains a large amount of the base, sodium. This reacts with the sulphuric acid ($2Na_2HPO_4 + H_2SO_4 = Na_2SO_4 + 2NaH_2PO_4$), and, as a result, there is left instead of the *alkaline* salt of phosphoric acid, an *acid* salt called sodium acid phosphate. The alkaline salt contains twice as much sodium

as does the acid salt. The sodium acid phosphate is then eliminated by the kidneys.

### How Eliminated

So, through the lungs and kidneys, acid wastes are constantly being given off. The acidity of the urine and the elimination of carbonic acid from the lungs vary with conditions of metabolism so as to maintain a normal balance between the acid and the alkaline elements. If for any reason alkali accumulates in excess, there is eliminated from the kidneys the alkaline phosphoric salt, disodium phosphate instead of sodium acid phosphate.

Besides sodium there are two other important alkaline bases, potassium and calcium, which, in the form of their salts, play a leading part in neutralizing body acids, but the surplus alkali, or the alkali reserve, remains in the body as salts of sodium. The sodium bicarbonate content of the blood is looked upon as indicating the state of the acid-base balance of the blood, or, as quoted from Macleod, the " bicarbonate represents the excess of the base [or alkali] which is left over after all the fixed acids have been neutralized. It represents the base that is available for the neutralization of any such acids as may appear. It is a measure of the reserve of buffer substance, or more specifically, the alkaline reserve of the body."— *John James Rickard Macleod, M. B., in "Physiology and Biochemistry in Modern Medicine."*

### The Body Living upon Its Own Tissue

It is quite evident, then, why foods containing the important bases — sodium, potassium, and calcium — must constantly be taken into the body. If these alkaline elements are furnished to the body in insufficient quantities so that no basic materials are at hand to unite with the sulphuric acid, which results from the metab-

olism of protein, this acid seizes upon the salts of the body tissues, which, as one writer expresses it, "wrenches from their places the bricks of the structure, thus bringing about katabolic destruction of the organism." It is ever true that when food elements are not supplied in sufficient amounts, the body first draws upon its reserve, and that being exhausted, upon its tissues.

## Source of Basic Salts

These alkalies we do not take in as alkaline bases, which would be irritating, but as salts in which the strong alkalies are combined. When they are absorbed and oxidized, they are set free to neutralize the acid products of metabolism. Vegetables are rich in the alkaline salts that furnish the strong bases,— sodium, potassium, and calcium,— as well as in other mineral salts needed by the body. It is hard for some to understand why fruits as well as vegetables help to keep the body alkaline, but the reason is this: salts of fruits are in the form of acid salts of these three basic elements, and are in organic combination with oxidizable food substances. When these food substances are oxidized in the blood and tissues, they yield the strong bases, which, forming carbonates, increase the alkalinity of the blood.

It is to fruits and vegetables, then, that we must look for our supply of mineral salts, and as in the process of food analysis in the body, *acid* wastes are continually being formed, so as a result of the synthetic processes of the plant laboratory, there is elaborated a preponderance of *alkaline* material.

## Table Salt

Potassium salts are supplied freely in vegetables, but it seems necessary to take some sodium chloride in the form of table salt in addition to that furnished in vege-

tables in order that sufficient sodium may be supplied to the body. Sodium chloride (table salt) is the one mineral element that man voluntarily adds to his food. While it is often used in excess, a certain amount is needed. The reason for the necessity of this addition of salt depends upon the richness of vegetables in potassium rather than sodium salts. Potassium, being a strong alkaline base, neutralizes the sulphuric acid of protein metabolism, this resulting in the formation of potassium sulphate, in which form it is ready for elimination by the kidneys. This potassium sulphate reacts with the sodium chloride of the blood and as a result of the interchanges, potassium chloride and sodium sulphate are formed. This changes the sodium chloride, a salt normal to the blood, to sodium sulphate, one which is foreign to the blood content. Both it and the potassium chloride are quickly eliminated through the kidneys, leaving the blood deficient in its sodium and chlorine supply unless additional salt is added with the food. However, Sherman says that *sufficient sodium would be supplied the body with one fourth the amount of table salt ordinarily used.*

### Deficiency Diseases; Demineralized Foods

If animals are fed on protein, fat, and carbohydrate, which have been separated from all mineral matter, they die sooner than if fed nothing at all, poisoned from the acid wastes which cannot be neutralized or eliminated.

In the ordinary diet some mineral salts are ever ingested, yet they are so often taken in such limited quantities that ill health and various debilitated conditions are frequently due to a diet deficient in this respect. Without doubt, deficiency diseases may as readily result from a diet in which necessary amounts of mineral salts are lacking as from a deficiency in vita-

mines and complete proteins. Fortunately, mineral salts go hand in hand with vitamines, and in planning a diet to secure sufficient vitamines and complete proteins the mineral salts, in a way, take care of themselves.

But we can see how an excessive carbohydrate diet, with its tendency toward acid fermentation in the digestive tract and carbonic acid formation in the tissues, tends to produce a condition of decreased alkalinity of the system. We can see also why cane sugar, the most concentrated form of carbohydrate, should be used in moderation; also why honey, the natural fruit sugar, which carries in its own combination its mineral salts, largely in the form of calcium, is better than refined sugars; why starch in combination with mineral salts, as in grains still retaining their outer layer, is better than the refined starch of white flour and polished rice. It is very plain, too, why excessive amounts of concentrated fat in the diet are not the best, because of the tendency toward fatty-acid formation in a clogged digestive tract or in the backed-up wastes of an incomplete metabolism. It is plain to be seen why fats already in combination with mineral matter and proteins, as cream, olives, and nuts, are better than the refined variety. And again we have one of the best of arguments in favor of a vegetarian diet with its abundance of alkaline salts as against a meat diet with its excess of acid ash.

### Natural Foods

Natural foods are ever furnished us in a combination that makes it possible for the body to care for them with the greatest ease. Natural foods come to us in combination with mineral salts and vitamines, thus furnishing with the calories the wherewithal to care for them and to counteract the untoward effects which might result from metabolic wastes. As man has en-

deavored more and more to make his food artificial by extracting, refining, and devitalizing, he has made it well-nigh impossible for nature to do her part, thus bringing upon himself the handicap of a body working against great odds, in the struggle for health and efficiency. The following is of interest in this connection:

"In regard to the calcium content of our food, investigators have pointed out that there is an insufficiency of calcium as well as of other minerals, all of which are essential for perfect health. Demineralization of our daily food does not seem to have attracted the attention that it deserves. Sherman has stated that the ordinary mixed diet of the Americans and Europeans, at least among dwellers in cities, is probably more deficient in calcium than in any other chemical element.

"McCann characterizes our food as 'processed, bleached, colored, denatured, degerminated, demineralized, and chemically treated.' Foremost among these denatured foods are bread, milk, cereals, and sugar. Whole-wheat bread is difficult to obtain, or is not usually eaten, only white bread. The outer part of the grain of wheat has to be removed to obtain white flour, which is practically all starch. The husk contains most of the mineral matter, including calcium, which is discarded.

"Nearly one fifth of the mineral contents of raw sugar is calcium. In the manufacture of white sugar all of the mineral matter is removed. Molasses and refiners' sirup are by-products of sugar, and contain practically all of the mineral matter. White sugar will not crystallize unless the mineral matter is removed. It is calcium which prevents crystallization.

"Candies are made from white sugar or glucose, neither of which contain mineral matter. Sugar and candy are therefore demineralized carbohydrates. Statistics show that about eighty-five pounds of sugar per

capita are consumed every year in this country. The mineral loss in our daily food from this source alone must be enormous."— *F. Tweddell, M. D., in Medical Record, Jan. 28, 1922.*

## Salts, Where Found

For those who may ask for a summary of foods containing various salts, we will say:

Mineral salts are contained in all natural unrefined foods; they are abundant in all vitamine-containing foods. Especially are they found in leafy vegetables and fresh fruits. They are found in milk, legumes, and nuts.

*Iron* is found in green vegetables and highly colored fruits, as cherries, strawberries, currants, etc. Egg yolks are rich in iron, as also whole grains, oatmeal, dates, prunes, raisins.

*Phosphorus* is found in egg yolks, in milk, in wheat bran, in beans, peas, oatmeal, and nuts. *Calcium* is abundant in milk, in all greens, carrot tops, turnip tops, etc. It is also found in oatmeal, peas, beans, nuts, citrous fruits, and prunes. *Potassium* is abundant in all vegetables, especially the leafy vegetables. The potato is rich in potassium salts. *Sodium* is found in all vegetables, but not to the same extent as is potassium.

All complete protein foods are rich in *sulphur.* The body cannot utilize sulphur except when in combination with the protein molecule.

*Acid-forming elements* predominate in meat, eggs, cereals. *Base-forming or alkaline elements* are greater in fruits, leafy vegetables, potatoes, carrots, turnips, beans, peas. Milk contains a balance of the two.

In an intelligently planned diet there will be avoided a preponderance of food yielding an acid ash and there will be assured an abundance of those foods furnishing alkaline end products. It should not be forgotten that there may be troubles from having the body ash too alkaline.

# CHAPTER XI

## FRUITS

In the past, fruit has not been accorded its proper place. While ever considered delightful and palatable, it is only recently that its real nutritive value has been established. There are few who realize the importance of a daily supply of fruit, preferably fresh, in the food ration. People eat fruit as they often eat candy, occasionally, irregularly, and between meals. Many will allow weeks to pass without partaking of fresh fruit. This may be due to thoughtlessness, lack of knowledge, or economic reasons. If any food must be left out, it is usually fruit, because it is considered a luxury, not an essential.

This is, however, a mistake. Other food will go farther and in the long run the expense need be no greater if allowance is made for supplying the body with the vital food elements as found in fruit.

### Fruit Sugar

As has been said, the caloric value of fruit lies in the carbohydrate which it contains. This is found in fruit as dextrose — glucose — which, as we have seen, requires no digestion. Closely related to dextrose, and practically of the same chemical composition, is levulose. Together these two simple sugars in fruit make up what is called fruit sugar. So in fruit we have a naturally predigested food, together with cellulose, which, by reason of its bulk, is a natural laxative.

The exquisitely flavored acid of fruit, which adds so much to its desirability, not only is an appetizer and a

delight to the palate, but has a definite favorable action upon the digestive tract. It is a direct stimulant to the gastric and intestinal glands, increasing the flow of the digestive juices. It also stimulates the muscular wall of the stomach and bowel. Thus in every way it increases digestive activity. For those who cannot take much cellulose, the fruit juices are a great help by reason of their natural laxative action.

### Fruit Acid

Fruit acid also has a decided antiseptic action in the digestive canal. It lessens bacterial activity in the mouth, sweetens the stomach, helps to check intestinal fermentation and putrefaction, and thus markedly lessens the formation of poisons resulting from germ activity in the alimentary tract. It is well known that acid fruits, such as the lemon, orange, and grapefruit, help to clear up a coated tongue, sweeten the breath, and are good for a torpid liver and biliousness. The bitter principle in grapefruit is said to act particularly on the liver.

### Acid Salts

The good influence of acid fruits does not, however, stop here, but is felt in an effective way after they are taken into the blood. The food value of the fruit fills a definite place as fuel in the body oxidation processes, but it is in the effect upon the blood that the most beneficial action is obtained. The acid of fruit is in the form of acid salts. They are organic salts of calcium, sodium, and potassium; for example, the calcium, sodium, and potassium citrate of the citrous fruits. These salts are in combination with the oxidizable sugar, and in the process of their oxidation and disintegration they yield the strong bases sodium and potassium.

These, forming carbonates, definitely increase the alkalinity of the blood.

This is a very desirable and necessary result, for, in counteracting the acidity resulting from protein wastes, it helps to maintain the normal alkaline reaction of the blood, and thus tends to neutralize the conditions associated with lessened alkalinity as found in rheumatism, gout, etc. (See Chapter IV, p. 31.) The grape, the prune, the plum, and the cranberry, while beneficial, do not affect the alkalinity of the blood to the same extent as the other fruits, for example, the apple, the orange, the lemon, the grapefruit, etc.

It was thought for years that fruit increased a tendency toward rheumatism, but we know now that this is not the case, but that most fruits lessen this tendency, and so are among the best rheumatic cures.

### Nature's Medicine

The vitamine content of fruit (see Chapter IX) is perhaps its most valuable asset. It is well known that fresh fruit, especially the citrous fruits, will cure scurvy. It is also true that they are valuable in other conditions of malnutrition. Fruit may well be considered nature's medicine. Fruits from which the juice can easily be extracted are of especial worth, one reason for the value of the orange, the lemon, and the grapefruit. Such juices may often be given invalids and children who could not take the cellulose accompanying the amount of juice they may be able to take with advantage. These citrous fruits also rank first in their content of vitamines and mineral salts.

From an editorial in the *Journal of the American Medical Association* we quote: " The rôle of orange juice in averting disaster under certain conditions of feeding, or in promoting the nutrition on certain dietary regimens, is beyond dispute."

"In water-soluble vitamine, orange juice is comparable with cow's milk volume for volume. It yields all the present known vitamines. . . . Apples, pears, prunes, also contain the water-soluble vitamine."

"Fruits always regarded as palatable are having their real worth established at length in a scientific way."

### Tomatoes a Substitute for Orange Juice

Tomatoes have been found to rank with oranges in their content of alkaline salts and vitamines. While often used as a vegetable, dietetically they must be considered a fruit. When oranges are found too expensive or are difficult to obtain, babies can be saved from scurvy by giving them tomato juice, and that even from canned tomatoes. This has been done with gratifying results among the poorer classes in large cities.

Fruits also contain a small amount of protein, usually about 5 per cent of their food value. The orange and the grapefruit contain as high as 6 or 7 per cent of their food value in protein. The food value of the banana is 7 or 8 per cent protein. While fruit cannot in any sense be depended upon to supply protein, yet, for some reason not well understood, those who eat an abundance of fresh fruit seem able to do well on a diet furnishing a smaller amount of protein than do those who eat little or no fruit. Perhaps this is partly due to the "protein sparing" action of the fruit sugar (see page 95), and partly to the high vitamine content of the fruit (see page 75).

### Stewed Fruit

The dietetic value of fruit is often counteracted to an extent by the large amount of cane sugar added. It will be found a great advantage to eat fruit in as nat-

ural a condition as possible. When sugar is added to stewed fruits, it should be cooked with the fruit. In this way the heat and fruit acid tend to change the cane sugar into the simple predigested dextrose, which results in a more natural and more easily digested combination. While stewed fruit is better than none, it can never quite take the place of fresh fruit. The heating, to an extent at least, devitalizes the fruit, and the added sugar tends to counteract the alkalizing effect of the fruit. It seems that the more acid the fruit the more stable are its vitamines. It is said that the juice of some berries, especially the raspberry, may be boiled an hour without losing its vitamine value, also that lemon juice may be boiled, bottled, and kept indefinitely without losing its vitality. The acidity of the tomato seems to thus stabilize its vitamine, so that the juice of canned tomatoes can be made to take the place of orange juice when the latter is not obtainable.

### The Banana

While it cannot take the place of acid fruits, and dietetically may in some ways be classed as a vegetable, the banana is a food of great worth. Its food value is similar to that of the potato. Its percentage of protein is somewhat lower, but its proportion of alkaline mineral salts is about the same. Too often it is eaten unripe, and, in this form, is indigestible because of its high content of raw starch. In the process of ripening, this starch is changed to sugar, and the ripe banana, with its yellow-brown speckled peel, is a food delightful in flavor and easy of digestion. It should, however, be properly masticated. Too often it is gulped down without sufficient mastication. Ordinarily a ripe banana eaten slowly and well masticated should cause no trouble, and may be well taken by children.

## How Fruit May Be Eaten

Some with catarrhal stomachs find that they do not take fruit well because of an irritated condition of the mucous membrane brought on by some other cause. In this condition the stomach lining cannot bear even the normal stimulation of the fruit acid and its cellulose. The trouble is not with the fruit, but with the primary state of gastric irritation. In some others, due to abnormal excitation or naturally irritable mucous lining, an excessive amount of the normal acid of the stomach is secreted, and the already irritated mucous membrane does not seem to bear well the addition of any more acid, even though it be the normal acid prepared by nature for us as food. However, even in these abnormal states, there is usually some way by which the fruit or fruit juice can be taken, and many of these persons do well if they eat fruits alone, not trying to combine them with other foods. Many who cannot eat fruit can drink fruit juice, say an hour before meals. Others may find that a fruit meal agrees with them if no other food is taken. This may be a fruit breakfast or a fruit lunch.

Dried fruits, as raisins, prunes, dates, figs, are a valuable source of fruit sugar, and may be used alone, or in combination with nuts and cereal to make very pleasing additions to any meal. For children they are invaluable as a means of satisfying the desire for sweets.

## Nuts and Olives

Botanically, nuts and olives may be classified as fruits, and for sake of convenience we will discuss them here. Nuts are of great value in the vegetarian diet as a natural source of fats and protein. The greater part of the food value of nuts is fat. The protein varies from 10 per cent of the food value in the walnut, to

15 to 18 per cent in the almond. The peanut, a legume rather than a nut, contains, of its total value, about 20 per cent protein. Nuts contain practically no carbohydrate. The fat of the nut is in the best form for digestion, because it is already in a combined, emulsified state.

The protein of the nut is of a very good quality. On this point, see quotation, page 209. As a natural source of concentrated food, supplying the most calories in the least bulk, nuts should have first place and should be eaten, not as knickknacks, but with true regard for their actual nutritive value. Too often they are eaten after a meal, when their food value is not needed and only imposes an extra tax on digestion and metabolism. But if they are allowed to take a definite place in supplying the body needs and are properly masticated, they are a food of great value.

Ripe olives, properly prepared, are a valuable source of fat, and may be eaten with good results by persons who cannot well take sufficient fat in any other form. They may be eaten at any or every meal, and if properly masticated, are easily digested and assimilated. There is no question but that the advantages looked for in the use of butter, may be obtained from the proper use of olives and nuts, providing the leaves of plants are used freely to supply necessary vitamines (see page 103).

*"There is in fruits and vegetables an apparent safeguard."—Journal of the American Medical Association.*

# CHAPTER XII

## VEGETABLES

### A Universal Food

No other food is so universally used by all classes as the vegetable. No daily ration seems complete without it, no matter how elaborate the other foods may be. Few live so largely on a meat diet that they do not feel the need of the accompanying vegetable to make their meal satisfactory. And to those who have adopted a fleshless diet it becomes, more than ever, an important part of their dietary, and greater dependence is placed upon it in the making up of their daily ration. Greater thought and care must then be accorded its preparation and more attention paid to the part it plays in the meal.

### Why of Value

Vegetables are valuable because of their cellulose, which, as before stated, serves as necessary bulk; because of their richness in mineral salts so essential to the blood and tissues; because of the great amount of vitamines they supply, without which the organic processes could not be carried on; and because of actual caloric food value, which is in very small amounts in some vegetables, but more abundant in others. Leafy vegetables, as lettuce, spinach, celery, cabbage, etc., while low in calories, furnish a goodly portion of these calories in the form of complete proteins. Green vegetables contain a large amount of water.

Botanically, vegetables may be classified as follows:

1. Roots — carrots, turnips, beets, parsnips.
2. Tubers — potatoes, sweet potatoes.

3. Leaves — lettuce, cabbage, cauliflower, asparagus, spinach, greens, etc. Onions are underground leaves.
4. Seeds or legumes [1] — peas, beans, lentils, peanuts, soy beans.

## The Seed Versus the Leaf

From a dietetic standpoint, McCollum divides vegetables (including grains) into two classes: the leaf (leafy vegetables) and the seed (grains and legumes). The seed of the plant is its storehouse and, aside from the germ, contains no living matter. The seed, while rich in caloric food value, is low in inorganic salts; is deficient in the fat-soluble vitamine, and its protein is not complete.

In contradistinction to the seed, the leaf of the plant is made up largely of *living* cells. It is the part of the plant that breathes; it is the laboratory of the plant where starches, fats, and proteins are built up. This portion of the plant contains those elements in which the seed is relatively poor.

## The Potato

Roots and tubers, while not seeds, must to an extent rank with the seeds, as they are largely composed of storage material. The part of these vegetables which may be classified with the leaves is the outer portion just under the skin, or that part usually discarded in paring. We quote: "The potato is to be classed with the seeds in its dietary properties because it consists largely of reserve food materials and relatively little of cellular elements. The results available indicate that if the potato is steamed and the thin paper-like skin removed without the loss of the cellular layer which lies

[1] In this class may also be placed the grains.

just underneath, it will contain relatively more of the fat-soluble A, a lack of which leads to the development of the peculiar eye conditions previously described, than do the cereal grains. . . . It would seem that a potato which is pared in the ordinary way and the paring discarded, is changed in its dietary properties in much the same way as is the rice kernel during the polishing process." — *McCollum, in "The Newer Knowledge of Nutrition," p. 47.*

### Comparative Costs

And again: "We may safely compare the cost of the cereal grains or the legumes with each other, or with the tubers such as the potato or the sweet potato, or with the root foods. It is not possible to compare the cost of any of these with milk or the leafy vegetable, such as cabbage, cauliflower, Swiss chard, collards, Brussels sprouts, onions, lettuce, celery tops, spinach, turnip tops, and other leaves employed as greens. Milk and the leafy vegetables are to be regarded as *protective foods.* . . . The leaves should not be regarded as foods of low value because their content of protein, fat, and carbohydrate is low, and the content of water high. . . . But they have a peculiar value . . . which makes them stand in a class by themselves among vegetable foodstuffs." — *Id., pp. 141, 142.* The proper combination of vegetables as to their kinds and parts becomes then quite apparent.

### How Much Cellulose?

The bulk of most vegetables is *cellulose.* The cellulose of some vegetables is tougher and more indigestible than that of others. The cellulose of vegetables is often more digestible raw than cooked, as for example, cabbage, which can be eaten raw by many who find it im-

possible to take it cooked. The amount of cellulose well tolerated by the digestive tract depends on the inherent strength of its muscular wall. Some can take a large amount of bulky food; others find food containing much cellulose difficult of digestion. All, however, need a certain portion of cellulose, or roughage, to stimulate the bowel to normal muscular activity. Much depends on the preparation of the food, the time spent in eating it, and the thoroughness with which it is masticated. With thorough mastication many of the bulkier foods ordinarily considered indigestible may be well taken and properly handled by the digestive tract.

All vegetables are rich in *mineral salts*, the leafy vegetables especially so, as we have seen. The potato also contains an abundance of alkaline salts, and, for this reason, is useful in conditions where it is desirable to render the blood more alkaline. This, no doubt, is the reason why the combination of "meat and potatoes" has always been so satisfactory; the acid ash of meat metabolism being neutralized, to an extent, by the alkalinity of the potato.

### An Iron Tonic

Green vegetables are particularly valuable for the iron salts they contain, thus being very helpful in cases of anemia. The iron obtained in this way is appropriated by the body to a much greater degree than that taken as "iron tonic" out of a bottle. The green coloring matter of the plant is known as chlorophyl. Chlorophyll is the respiratory and starch-making portion of the plant, and is essential not only to plant life but to animal life as well. Hemoglobin, the red coloring matter of the blood, is analogous to the chlorophyl of the plant, and just as chlorophyl is necessary to plant life, so is hemoglobin necessary to animal life. Green vege-

tables contain substances closely related to the red of the blood, and the quality of the hemoglobin of the blood, with its iron content, may be altered materially by a deficiency or an abundance of these important and vitalizing fluids.

The *vitamines* present in these green and leafy vegetables make them invaluable as an article of diet, both for the invalid and for the person in normal health; for the child as well as for the adult. For the child they are especially valuable because of the "fat-soluble" vitamine they contain, which has to do with normal growth and development. (See Chapter IX.)

## Spring Fever

In cities and countries where green vegetables cannot be obtained during the winter months, people often suffer the results of a vitamineless diet. Dr. Evans, a noted health writer, says that one half of the people in the cities have a touch of scurvy every winter. This may account for the epidemics of "spring fever" so prevalent as winter ends, and the use of liver pills and blood purifiers at this time of the year. All vegetables, however, contain vitamines, and when green vegetables cannot be obtained and fruits are expensive, the proper preparation of winter vegetables may supply necessary vitamines. The skins of winter vegetables partake of the nature of the leaf, and may be utilized in such a way as, to some extent, to take the place of leafy vegetables.

While those parts of the vegetable which are made up largely of caloric food material in storage, are comparatively low in protein, the protein value of the leaf and skin is relatively high and of the best quality. It is interesting to note that, while the total food content of leafy vegetables is often low, of this low total a high

proportion may be *protein,* ranging from 25 to 40 or even 50 per cent.

The actual *energy* value of vegetables varies within rather wide limits from the cabbage, containing 2 to 5 calories to the ounce, to the bean, furnishing a food supply of 65 calories to the ounce.

### Hot Weather Food

Green vegetables contain much *water,* as high as from 80 to 92 per cent. For this reason an animal feeding largely upon leaves and green vegetables drinks much less water than one subsisting upon a diet of grain. For this reason green vegetables are especially good as "hot weather food."

### Raw Foods

The question of the preparation of vegetables is a most important one. Uncooked vegetables contain the highest percentage of vitamines, and such vegetables as carrots, turnips, cabbage, as well as lettuce, water cress, tomatoes, celery, etc., may be eaten raw with great advantage. These prepared in the form of salads may be served in a most attractive way. (See recipes, Chapter XXXI.) In this they may, to an extent, take the place of fruit. Says Leonard Williams, M. D., of London, in the *British Medical Journal,* of July 31, 1920, in speaking of an exclusive raw food diet: "Now this intensive vitamine dietary, the exclusion, that is, of all cooked foods and drinks, is extraordinarily efficacious therapeutically. It not only assists other forms of treatment by improving the soil and re-enforcing the defenses, but it is of itself, positively curative in most forms of chronic disease."

The process of cooking unfortunately often greatly lessens the nutritive value of vegetables. It is possible,

however, so to prepare and cook them that they will not lose their nutritive and vital elements; and it is very important that this be accomplished.

### A Waste

The ordinary method of vegetable preparation includes the removing of the skins and those parts containing the tough, more fibrous portion of cellulose, such as celery tops, asparagus butts, pea pods, etc. These parts, however, contain many of the valuable salts and vitamines and often a comparatively large amount of protein. For example, the greater part of the protein nourishment lies, with the salts and vitamines, just underneath the skins of such vegetables as the potato, carrot, etc., and so is lost when these are thrown away. (See quotation, page 100.) Carrot tops are said to be particularly rich in calcium or lime salts.

### Food Value Lost

When vegetables are boiled, a considerable portion of the remaining nitrogenous elements and vitamines passes into the broth, and not infrequently is thrown down the sink, instead of being used where it is so often sorely needed in the supplying of body needs. "When potatoes are peeled, allowed to stand in cold water and then boiled, they lose about 50 per cent of their protein and 40 per cent of the mineral matter and vitamines. As usually prepared and cooked, carrots lose 40 per cent of their protein food value and 25 per cent of their sugar." The cooking of other vegetables results in about the same loss. In this way much of the delightful flavor is lost, and the vegetables lose to a great extent their satisfying palatability.

### To Prevent Waste

These losses may be prevented in a number of ways. Vegetables may be cooked without paring. They may

be baked, boiled, or steamed, the skins being removed just before serving, or eaten, as in the case of baked potatoes. A very satisfactory way to prepare vegetables is to steam them. Even better than to put them directly into a steamer, is to put in the steamer the vessel in which the vegetable is to be cooked; cover well, so that the steam will come in contact with the vegetable over the sides of the smaller pan. This method retains in the vegetable all the valuable elements and gives it a very delicious flavor.

The water in which vegetables are boiled should never be thrown away, but should be saved and used as a basis for soups and gravies. Better still, cook them in a small amount of water so that there is no broth left. They should always be cooked in *salted* water. The salt in the water helps to prevent the extraction of the salts from the vegetables.

### Vegetable Extracts

As a variation and for those members of the family not able to digest cellulose well, vegetable broths and purées may be prepared in such a way as to supply all valuable vegetable elements except the cellulose. The vegetables, having been thoroughly cleansed with a brush, may be cut up and cooked without paring, or the parings may be cooked by themselves (see recipe 24, Chapter XXXI), and in this way the nutritive elements extracted. This being a process of extraction, instead of retention, the cooking may be more prolonged than otherwise and better at the simmering point, i. e., 190° F. instead of 212° F., the ordinary boiling temperature. A somewhat prolonged cooking of one and a half or two hours tends to quite thoroughly extract the food elements from the vegetable. In this case the vegetables should be cooked in *unsalted* water, this tend-

ing to draw the salts from the vegetables into the broth. Pressing through a colander or sieve will separate the skins and cellulose and leave practically all the nutritive elements in the broth and purée. The elements thus extracted contain the meaty savor which is an appetizer and tonic.

Delicious soups may be made in this way, and from the standpoint of economy they are well worth while, as parts are used that ordinarily find their way to the garbage can. Outside lettuce leaves, celery tops, tops of turnips, beets, carrots, the tougher portions of asparagus, and even pea pods may be boiled, and from these portions will thus be obtained food elements that will greatly increase the total value of the vegetable. Pea pods may be boiled and then the peas cooked in the pea pod broth. The water in which the asparagus butts have been boiled, may be used in which to cook the asparagus tips. Prepared in these economical ways, vegetables no longer remain simply carbohydrate food, but may be made to supply to the body a comparatively large portion of nitrogenous material.

Vegetables should be cooked until tender, but care should be taken that they are not overcooked or allowed to become water soaked. Cooking is often prolonged much beyond the necessary time, and this at a high temperature, which tends to devitalize the food and in no way increases its tenderness or desirability. The prolonged subjection to heat may even toughen it. Spinach is often cooked one to one and a half hours, when cooking from twenty to thirty minutes is usually quite sufficient, leaving the vegetable much more desirable as a food.

### Effect of Cooking on Vitamine

Just how much cooking destroys vitamines is a debated question. While, as a general principle, we must

concede that raw food contains more vital elements than cooked, and that every one should eat some raw food daily, yet many vitamines, especially those of vegetables, are in stable combination and the effect upon them of cooking may be very slight. Dr. George F. Still, of London, is quoted in the *British Medical Journal* of July 31, 1920, as follows: "It has been generally supposed that the antiscorbutic vitamine is easily destroyed by heat; in curious apparent contradiction of this view is the powerful antiscorbutic effect of potato after being thoroughly cooked. One of the most rapid cures for infantile scurvy is floury baked potato, which is given beaten up with the infant's food. If there is a difference between foods in this respect, it may, I would suggest, depend not merely on the amount of vitamine present, but upon the manner in which the vitamine is contained in the food; one can imagine, for instance, that the vitamine may, to borrow a chemical phrase, be in looser combination in one food than in another, and so may be more exposed to destruction by heat."

The nutritive value of vegetables has become established beyond a doubt. It is important that they form a large part of every daily ration, not only for the adult, but also for the child. They should be considered a real food rather than merely a relish, and they will occupy a place in the rôle of nutrition that they have never had when housewives learn to prepare them in such a way as to retain all their food elements.

*"Thou shalt eat the herb of the field."—Bible.*

# CHAPTER XIII

## BREADS AND CEREALS

### The Staff of Life

Bread is the staff of life and without the homely loaf we would often feel unsatisfied, even though surrounded by the most tasty viands. Some one has well said that "there is true religion in a loaf of good bread." Today, when the cost of living is high, the quality of our bread becomes a question of the greatest importance, and when we are confronted with the fact that the refined flour of today has been robbed of life-giving properties by the removal of the outer layer of the grain, it behooves us to cultivate a taste for real Graham bread and demand whole flour instead of that which has been devitalized. (See Chapter IX.)

### The Whole Grain

Whether bread is made from wheat, rye, or corn, flour containing the whole grain should be obtained whenever possible. In this way not only are the valuable vitamines and mineral salts saved to the body, but the extra bulk is a great help in the prevention and treatment of constipation. One of the most generally recognized foods indicated in constipation is bread containing an excess of bran. However, the addition of sterilized bran to bread made from devitalized flour, while of some benefit, cannot take the place of bread containing both the coarse outer covering and the vitamines which would be found in Graham bread made from real Graham flour.

Genuine whole-wheat or Graham flour is difficult to obtain, but its value as a food is worthy of a determined

effort to obtain it and to eat it every day as bread, raisin bread, nut bread, or gems. The flour sold as whole wheat is usually a combination of a few of the several low grades of flour, middlings, and bran produced by the roller processes, and so does not contain vitamines.

After being ground, the outer layer containing the germ will not keep more than a few weeks and so cannot be stored indefinitely. For this reason the manufacturers will not keep it on hand until the demand for it is greater than it has been. But the occasional small miller can often be found who will grind the whole wheat berry, as it is called for, or the wheat can be ground at home in a small mill or even in a coffee mill.

### Home-Ground Wheat

Several families may club together and buy a mill, in which a supply of whole-wheat flour may be ground for them all. This has been done by many with satisfactory results. We are too often prone to do the easy thing, but a sense of the importance of having the best, most wholesome bread will result in a determined effort to obtain it, and " where there is a will there is a way."

### Whiteness Not an Indication of Quality

When it is not possible to obtain real whole-wheat bread, a general rule that is quite safe to follow is that, other things being equal, dark bread is better, even though baker's bread, than white, in that it undoubtedly is richer in mineral salts. A step has been taken in the right direction when the public can be made to see this and to get away from the idea that the better the bread the whiter it is. It is well to remember that natural foods have color as compared with refined foods; e. g., brown sugar has mineral elements of which the

white refined variety is entirely devoid. Fortunately, we are not dependent upon bread alone for vitamines, and what we miss by being obliged, at times, to eat devitalized bread we may make up by using freely of other vitamine-containing foods.

### Fresh Bread

Given bread made from flour which is of the right quality, it should be prepared in a way that will permit of easy digestion. Bread raised with yeast, most commonly used and undoubtedly the best, should, of course, be light and sweet; but aside from these qualities there is another qualification to which we pay little attention, and that is the process through which bread passes after it is baked. Fresh bread is difficult of digestion, and this difficulty is enhanced by the common addition to it of large amounts of butter. Being soft, it is not thoroughly masticated, and it is often swallowed in masses which become soggy in the stomach. The gastric juice is unable to mix thoroughly with it, digestion is delayed, and fermentation results. On the other hand, if bread is allowed to stand for twenty-four hours or more, important changes take place which eliminate its indigestible qualities. It becomes drier, separates into small particles more readily, and certain chemical changes actually occur in the protein as the bread becomes stale that greatly increase its digestibility.

### Oven Toast or Zwieback

These conditions are enhanced when bread is twice baked, as in oven toast, and for one with a weak digestion there is no bread so well received by the stomach. The starch is partly digested by the extreme heat and we speak of it as being "dextrinized." Its brittleness allows of easy solution by the digestive fluids.

## The Wrong Way

Toast, as often made, is not better than fresh bread. A slice of bread is taken and browned superficially, leaving the center soft and often more like fresh bread than if it had not been toasted. This is then covered with butter and reheated, making a combination in the "hot buttered toast" as ordinarily served, that can hardly be called hygienic, even though commonly considered under the head of invalid dietary. The thorough mastication of hard breads would tend to prevent much of the premature decay of teeth so prevalent among the American people. Here as elsewhere are often seen the results of lack of exercise, and the teeth tend, because of disuse, to fall into degeneration and premature decay.

## Devitalized Bread

Baking powder and soda breads are not the best for several reasons:

1. They are usually made of refined, devitalized flour.
2. They are served hot, and eaten with an excess of butter.
3. Soda and baking powder destroy the vitamines, so even though whole grain were used, the addition of these powders would tend to devitalize the grain, with a resulting vitamineless bread.
4. Baking powders, even though the best, leave in the bread a chemical residue, the continuous ingestion of which is not conducive to health.

In a baking powder two substances are combined, one alkaline, the other acid, in character. The alkaline substance is soda, the acid may be cream of tartar, acid phosphate, or an acid salt of alum. The chemical reaction between the acid and the alkali results in the formation of carbonic acid gas ($CO_2$) and a salt. The gas passes off and makes the bread light, the salt is

left behind as a residue in the bread. In the alum baking powders the residue is particularly unhealthful. Analysis has shown that a cream of tartar baking powder leaves about 70 per cent of its own weight in Rochelle salts as a residue and that the acid phosphate leaves about 35 per cent of its own weight in sodium phosphate. These salts are all saline cathartics. Rochelle salts is the basic element of a Seidlitz powder. From the United States Department of Agriculture in Bulletin No. 13, we receive the information that "a loaf of bread made from a quart of flour leavened with cream of tartar baking powder contains forty-five grains more of Rochelle salts than is contained in one Seidlitz powder." Also, in a report on baking powders by the Referee Board of Consulting Scientific Experts, appointed by the United States Department of Agriculture, we read that "it is wise to be moderate in the use of foods that are leavened with baking powders." Dr. A. Warner Shepard, formerly health officer in Brooklyn, said: "I have not the slightest doubt that the mental and physical health of thousands is permanently injured by the excessive use of Rochelle salts in bread and other forms of food and drink. It irritates the kidneys, bowels, and stomach and may therefore produce most unfortunate results."

## How to Use Soda

5. Soda, if used at all, should be used with an acid in *exact* proportions, so that there may be no excess of alkali. The most accurate way to use it is with hydrochloric acid in the proportion of one exactly level teaspoon of soda to 80 minims of hydrochloric acid. In this way the following chemical reaction takes place: $HCl$ (hydrochloric acid) + $NaHCO_3$ (soda) = $NaCl$ (salt) + $H_2O$ (water) + $CO_2$ (carbonic acid gas). The end

products are simply common salt, water, and carbonic gas or carbon dioxide. This measurement, however, must be exact. Only the *careful* housewife should use this combination.

We quote from "The New Cookery," by Lenna Frances Cooper: "It is advisable when using hydrochloric acid to have a minim glass, which can be purchased for a small sum at any drug store. One perfectly level teaspoon of soda is neutralized by 80 minims of hydrochloric acid. The hydrochloric acid must be chemically pure (marked C. P.) and in the concentrated form. One teaspoon of soda and 80 minims of hydrochloric acid are equivalent to four level teaspoons of baking powder. . . . For most recipes, one-half teaspoon of soda and 40 minims of hydrochloric acid are sufficient to use with one cup of flour." (For warm breads without baking powder see Recipes, Chapter XXXI.)

Very satisfactory breakfast gems may be made without the use of baking powder or soda. These are best made with whole-wheat or Graham flour and are light and easy of digestion (see recipes 1 and 2).

## Cereals as Protein Foods

Cereals are very useful foods, and it is most important that their comparative values be understood by the housewife. The greater part of the protein of all cereals is found in the pericarp and just beneath it, so any whole cereal is comparatively rich in protein. Even rice ceases to be merely a starchy food when not deprived of its outer covering. The tables in Chapter VI give the approximate protein value of these foods. Whole or cracked wheat, oatmeal, and whole rice contain 13 to 18 per cent of protein, and so are of great help in the making up of the necessary daily ration of nitrogenous food. The proteins of cereals, which are often incom-

plete, need to be supplemented by those of other foods, as milk, eggs, and vegetables. This is due in part to the fact that much of the cereal eaten has been deprived of important proteins in the outer covering. However, a monotonous diet largely of cereals or of a single cereal should be avoided. (See Chapter VI.)

### To Cook Cereals

Cereals should be thoroughly cooked, preferably in a double boiler or a fireless cooker. The length of time required varies, but is usually two and one-half to six hours. This softens the outer covering and prepares the grain for easy and complete digestion. For invalids or for small children, it may be necessary to serve cereals without the rough elements, but the prolonged cooking has put into solution most of the salts and vitamines of the outer layer, and they are not lost to a great extent when only the harsh exterior is strained away. Gruels, while usually considered invalid dishes, make a nice variation from the ordinary breakfast mush and may be served for a change to the entire family for breakfast or as an evening lunch. (See recipes 19, 20, Chapter XXXI.)

For many, the dextrinized cereals, as cornflakes, wheatflakes, shredded wheat, etc., are much easier of digestion than mushes, which are often soggy and swallowed without sufficient mastication. Mushes, when served, should be prepared in such a way as to render them dry and flaky, and should be eaten with proper regard for mastication.

Rice which has been browned in the oven before cooking, and thus its starch dextrinized, makes, when eaten with milk or cream, a very agreeable breakfast dish, and is very easily digested.

# CHAPTER XIV

## DAIRY PRODUCTS

DAIRY products have ever played an important part in the nutrition of civilized man, and a shortage of these valuable foods must always be regarded as a calamity. From this source, protein that has been elaborated in the animal body may be obtained, lessening markedly any necessity for the use of meat, even by those who depend upon animal protein for their supply of nitrogenous food. Associated with these proteins, are mineral salts and vitamines which add greatly to their value. Milk is an important source of the fat-soluble vitamine, and egg yolk is rich in iron. Milk and eggs, being produced primarily for the nutrition of the young of the animal, are rich in those things necessary for body development and the formation of new tissue.

### Variation Possible

Not only is milk itself of value for children, invalids, and general family use, but the products derived from it make possible an agreeable and helpful variation in the form in which the protein and fat of milk may be served. Those who do not care for milk to drink, usually take it freely as used in cooking, in milk soups, creamed vegetables, on cereals, in custards, puddings, desserts, etc. There are few families where milk in some form as a seasoning and constituent of various dishes is not deemed a necessity. As buttermilk and cottage cheese, the protein of milk may be served in a very valuable form, and one most easily used by the body. The various forms of cheese are used the world over, and by many are considered indispensable. Butter,

the concentrated fat of milk, is the most commonly used of free fat, and few would be able to eat a satisfactory meal without it.

Eggs, except when prices are prohibitive, are commonly used in every household, and are served in so many ways that they may be used daily without apparent monotony.

### Necessary Considerations

There are many things in regard to these important foods to which the attention of the people should be continually drawn: The purity of their source, with possibilities and probabilities for contamination, their care before reaching the consumer, what proportion of the daily diet they can well make up, and their action in the digestive tract, with resultant effect on the blood and tissues. These and more should receive careful consideration.

### Danger of Contamination

*Milk.*[1]— The source of milk is unfortunately ever more or less questionable because of the disease of animals, the great care necessary to avoid contamination at time of milking, and the varying length of time after milking that elapses before it is taken as food.[2] Nature intended the milk to pass directly from the mother to her young, with no interval affording possi-

---

[1] See also Chapter XXVIII.

[2] The problem of our milk supply is expressed by Rosenau as follows: "Milk is responsible for more sickness and deaths than perhaps all other foods combined. There are several reasons for this: (1) Bacteria grow well in milk; therefore a very slight infection may produce widespread and serious results; (2) of all foodstuffs, milk is the most difficult to obtain, handle, transport, and deliver in a clean, fresh, and satisfactory condition; (3) it is the most readily decomposable of all our foods; (4) finally, milk is the only standard article of diet obtained from animal sources consumed in its raw state."

"Fresh milk products may be quite as dangerous as the milk from which they are made," states Rosenau; but he goes on to say: "Milk is a perfect food for the suckling. It contains all the essential elements of a well-balanced diet for the adult, and at prevailing prices, it is one of the cheapest of the standard articles of diet. Furthermore, it is readily digestible and is capable of a great variety of modifications. The sanitarian, therefore, has every reason to encourage the use of pure milk as well as to discourage the use of impure milk." — "Preventive Medicine and Hygiene," pp. 494, 495.

bility for contamination. Even greater danger than in the disease of the animal itself, lies in the many opportunities for contact with germs and impurities at the time of and after milking, and the ease with which milk undergoes deterioration and putrefaction after it leaves its source. The milk, even from a tubercular cow, may be of very good quality, providing contamination from the discharges of this cow can be prevented at time of milking. It is said that infections of milk always occur at the time of the drawing of the milk from contact with extraneous impurities, e. g., the milker's hands, the hairs and exhalations from the cow, stable dust, etc.

However, much has been done by health authorities to minimize the dangers of impurity, and it is possible in all cities to obtain milk guaranteed as to its cleanliness. The regrettable feature about this is its effect upon the price of good milk, making it in many cases almost prohibitive.

### A Friendly Germ

Possibilities for deterioration of milk from the time of milking until it finally reaches the consumer are many, and again make it difficult to know that milk is in good condition, except in the case of certified milk. Fortunately, milk sours before it becomes very old, and the lactic acid formed inhibits the action of putrefactive germs. This natural protective measure ordinarily prevents the using of milk in which putrefaction has set in. However, under certain conditions, as refrigeration, the activity of the lactic acid germ may be inhibited and the milk putrefy before it sours, accounting for the bad taste, known to housewives, of milk which, though not sour, has stood a long time in the ice box. This milk is harmful, sour milk is not. The only general rule

for knowing that all milk used, while perhaps not *clean*, is at least sterile and safe to use for all purposes, is to *boil it.*

While this may be said to lessen the value of its vitamines, these can be supplied by other foods and the milk still furnish its other food elements unchanged. Diseases spread by unclean milk are many. Among them are pus infections, typhoid fever, tuberculosis, and scarlet fever.

### Boiled Milk

As it is also known that the boiling of milk changes it from a solid food, as evidenced by the large, tough, leathery curds formed in the stomach from raw milk, to a relatively liquid food in which the curds are small and easily digested (see page 175), it makes the question of the advisability of boiling milk, especially for children, a nondebatable one. Boiled milk, unless in sterile containers, as bottled baby's milk, should never be allowed to stand a long time after boiling, but should be used soon.

All animal protein is more or less susceptible to putrefaction in the digestive tract. The using of milk which is fresh and as nearly sterile as possible, or in its lactic acid form, as cottage cheese or buttermilk, greatly lessens the probability of putrefactive processes in the alimentary canal. It is very important that there should be included in the diet a goodly amount of such foods as fruit and green vegetables, which will facilitate intestinal activity and thus prevent conditions of stagnation and putrefaction.

### Stale Milk

Pasteurizing milk, or heating it to a temperature of 140° F., kills the disease-producing germs and postpones souring. It does not, however, to the same degree prevent putrefaction.

So it is possible for the milk to deteriorate greatly, so much so that putrefactive processes may set in before it sours, just as in refrigeration. Pasteurization, while in many ways beneficial, has too often meant stale rather than fresh milk. Raw milk, obtained as fresh as possible and boiled before using, is, in the author's opinion, to be preferred to Pasteurized milk. Evaporated milk may be used in cooking if fresh foods are used freely. It should be remembered that it is a devitalized food, and should never be depended upon to take the place of fresh milk.

**How Much Milk?**

The amount of milk that can be used by different individuals varies greatly. It depends upon the form in which it is taken and the amount of other protein food in the diet. If meat is included, much less milk is needed. For vegetarians, milk affords a valuable means of furnishing the concentration of protein often necessary to balance the excessive amount of concentrated energy food taken. When it is found that the protein ration falls short of the necessary 200 or 250 calories, it can easily be brought up to normal by the use of milk protein in some form; as milk, buttermilk, or cottage cheese. Good cottage cheese is one of the best forms in which milk protein can be taken, and is usually well borne even by those having a weak digestion. *Cheese* is difficult of digestion, and may well be eaten sparingly, if at all.

*Butter* is of value because of its food concentration and its content of fat-soluble vitamine. However, much more butter is eaten by nearly every one than should be. In the amounts in which it is eaten it helps to increase the excess of fat eaten by the American people, and as an excess of free fat, is often a hindrance to digestion. (See Chapter VII.) Withal, it tends to partake of the

disadvantages of contamination to which all animal food is liable, and being rather unstable, it easily becomes rancid, especially when subjected to heat.

## How to Obtain Fat-Soluble A.

These facts should be remembered, and butter obtained in as fresh and clean a condition as possible. It should be used, as all concentrated foods, in moderation, and better not at all in cooking. Much more butter is given to children than necessary or advisable. It is much better that they obtain their butter fat, with its fat-soluble A, in the milk itself, the food value of which is 50 per cent fat. Or, if necessary, in added cream. The vitamine value of their milk should be supplemented by the high vitamine content of green vegetables and fruits, especially orange juice and tomato. These vegetables and fruits also increase intestinal activity, thus combating the tendency of milk to favor intestinal putrefactive processes. It is not the butter that children need particularly, but the vitamine that it contains, and if a sufficient supply of these vitamines can be secured without butter, there can be no advantage in depending upon butter for a greater supply. Speaking of experimental studies along these lines, an editorial in the *Journal of the American Medical Association* of April 12, 1914, says: "It is through such laborious studies, in which American physiologists have been conspicuous pioneers, that the danger of identifying certain butter substances with butter has been averted."

## A Source of Iron

*Eggs* are of great value, first for the complete protein of the egg white; second, for the iron and vitamine content of the yolk. Egg protein, as that of milk, is often a great help in balancing the diet of one whose daily ration is top-heavy in energy food and low in protein.

### A Protective Combination

Eggs are digested with ease in the stomach. Their disadvantage lies in the fact that they tend to favor intestinal putrefaction; for this reason, their reputation for producing biliousness. But combined in a properly planned diet and eaten in moderation, they need not do this. Eaten in excess, they tend to produce the results that follow an excess of protein in any form. One including in one's diet animal proteins of any kind, cannot permit to any degree a condition of intestinal stagnation, because of the putrefactive conditions to which animal protein is ever subject. For this reason the successful use of animal proteins in the diet depends upon their being combined with a large amount of fresh fruits and green vegetables, both of these tending to combat the putrefactive tendency of the protein food. Children who can have plenty of milk are just as well off without eggs, as the simpler, less stimulating diet may be considered better for them.

Eggs, as well as milk, should of course be obtained as fresh as possible, and from hens that are clean and well kept. Not only is the purity of the egg affected by the condition of the hen itself, but also by contact after the egg is laid. The shell being porous, impurities are soon absorbed. So it is a great advantage when eggs can be gathered as soon as laid and washed before being put away.

### Eggs in What Form?

It matters little in what form eggs are served, soft, medium, or hard boiled, poached, or scrambled, or in the form of an omelet. The fried egg is rather indigestible, as are all fried foods. A hard-boiled egg, if masticated well, is quite as digestible as any other. One of the best ways in which to prepare eggs is to boil

them twenty to thirty minutes, or until the yolk is mealy. Egg yolks prepared in this way may be a valuable source of iron and vitamines for children and invalids.

There is not the advantage in raw eggs once ascribed to them. Experiments have shown that cooked eggs are more easily digested than raw, unless the raw egg is thoroughly beaten, so that the tenacious white is thoroughly divided. The beaten egg added to gruels, soups, or served as fruit eggnog (see recipe 110) is often of advantage in the feeding of the sick, and, served with fruit, as prune or apple whip, etc., helps in making pleasing and healthful desserts.

Not altogether so healthful as has been supposed are desserts in which milk, eggs, and sugar are combined. Intestinal fermentation and putefaction are in many cases favored by this combination.

Again we would urge, that if one wishes to combat the digestive disadvantages of a diet including animal protein, one should realize the importance of a free use of those foods which will make impossible any abnormal delay in the passing of these animal proteins through the digestive canal. Too often an excess of animal protein is taken under conditions of liver torpidity and intestinal sluggishness, which furnish a most fertile field for the growth of the putrefactive bacteria so prone to act upon protein foods. Because of the delay in digestion, there is ample time for these putrefactive processes to be carried to the point of extreme toxin formation with harmful systemic effects.

With a free amount of fruit and vegetables, this tendency may in most cases be largely overcome.

# CHAPTER XV

## FLESH FOOD: IS IT A DIETARY ESSENTIAL?

### Discussion I — Desire

A VEGETARIAN was asked the question, "Why do you not eat meat?" His reply was, "Because I no longer have any desire for it;" and he added, "I turn with aversion from the thought of partaking of it, and were it not for the occasional sight of some one enjoying heartily his meaty viand, I might almost forget that others are different from myself in this respect or that meat is served as an article of food."

This vegetarian had almost forgotten just why he did not eat meat. It wasn't that the doctor had said he shouldn't, or that he couldn't afford it; his first thought in answer to the question was, "I don't want it."

The reason he gave for the fleshless diet is a very important one; for, unless one can reach such a state of mind, one's vegetarianism is liable to be a failure. And, after all, there are very few of us who will resist for an indefinite period a craving for some article of food or drink, no matter what the theory or how great the determination; either the desire abates and finally flees, or we drift back into the old habit and thus satisfy the clamor of appetite's demands.

Again, who can say that an insatiable craving that persists in spite of time and determination, is anything less than a physiologic demand for some needed element or combination of which the body is being deprived? Today, when meat is the most expensive of foods, there are few who would not be more than willing to omit it from their bill of fare, could they feel satisfied and well nourished without it.

## Habit and Education

Our gustatory likes and dislikes are the result of two things: First, an expression in our consciousness of body needs; second, habit or education. A change in our mode of eating must not fail to guarantee to the body all food essentials. Habit and education, however, often require readjustment. This necessitates a knowledge of why the change is being made and the right mental attitude on the part of the individual. With body food requirements satisfied and intelligent mental co-operation, re-education becomes a simple matter.

In many ways, eating is largely a matter of habit. The tribes of Central Africa eat their pudding of mashed ants with as much relish as we our calves' brains or pickled pigs' feet. But few of us would partake with very much enthusiasm of our favorite meat dish, with all its uncertainties, had not habit accustomed our minds to the thought.

Just now I think of a rosy-cheeked lad of ten, who, having never tasted meat, stares with an expression of abhorrence and absolute lack of understanding upon the rare occasion of seeing others indulge with zest in the wing of a chicken or a juicy beefsteak. But rules, theories, our better knowledge, even our sense of esthetics, often avail little as against habit, custom, and appetite's clamorous appeal. And so I say again that the reason given above is of great importance and perhaps the only one that will hold good in the last analysis.

## Re-education

But how may such a mental attitude be acquired? By re-education and a satisfactory alternative in the way of a sense of well-being and complete nutrition on a diet which does not include flesh food — "if there be first a willing mind." The number of vegetarians is

increasing, and there are many who have long since reached the period in their physical existence where flesh food no longer finds a place on their table or in their daily dietary. Many of these are contented, well nourished, and splendid physical specimens, and of the same mental state as the vegetarian quoted. The thought is growing that the American people eat far too much meat, and that the ideas of the people are already being greatly modified as to the desirability of this class of food.

### Discussion II — Need

Scientific investigation has shown quite conclusively that body needs can well be supplied without the use of meat. Says McCollum, of Johns Hopkins, after experimental work covering a period of years: "Lacto-vegetarianism [a vegetarian diet including milk] . . . is, when the diet is properly planned, the most highly satisfactory plan which can be adopted in the nutrition of man." — "*The Newer Knowledge of Nutrition,*" p. 52.

The food principles of a complete diet are: carbohydrates (or starches and sugar), fats, protein, mineral matter (or salts), vitamines, cellulose, and water. The first two are heat and energy foods; the second two are building material for the body; the fifth contains the vital elements found in fresh and raw foods, the presence of which makes it possible for the body to conduct its life processes; the sixth, passing through the digestive tract, furnishes necessary bulk; the seventh, as solvent, diluent, and conductor, holds an important place.

### Quality Versus Quantity

It is of great importance that these food elements be supplied to the body in proper amounts and proportions, but it is quite as important that *quality* as well as

*quantity* be considered. Especially is this true of nitrogenous foods. The structure of the proteins is more complex than that of any of the other food classes, and a complete protein is said to contain some eighteen nitrogenous combinations, called amino acids, and often likened to " building stones." In order to build the many and varied body tissues, the protein part of our food must supply all of the eighteen building stones. A protein that lacks in any of these is said to be incomplete. It is then of greatest importance that we know where complete proteins are found, in order that our food may contain all that is necessary to keep the body in the best of repair.

The value of meat as a food lies in the protein which it supplies. These proteins, being in the form of the actual muscle and tissue of the animal, are complete in that they contain all necessary protein elements. But meat cannot be depended upon to supply food elements other than protein. It supplies energy food only in so far as it contains fat. To insure vitamines it should be eaten raw, with a large quantity of the blood. To furnish a sufficient amount of mineral matter it would be necessary to eat the bones.

## Blood and Bones

Quoting again from McCollum: " The pronounced deficiencies of muscle tissue [lean meat] as a foodstuff, naturally suggests the question of the reason for the success of the nutrition of the strictly carnivorous animals. The explanation is found in the order in which such creatures select the parts of the carcasses of their prey. The larger carnivora, after striking down an animal, immediately open the large veins of the neck and suck blood as long as it flows. Their second choice of tissues is the liver, and following this the other glandu-

lar organs. Muscle tissue is only eaten after these have been consumed. With such a selection the animal secures everything which it needs for its nutrition except a sufficient amount of calcium, and this is obtained through gnawing off the softer parts of the extremities of the bones." — "*The Newer Knowledge of Nutrition*," *pp. 78, 79.*

### Protein Letters

This plan hardly being feasible for any of us, we find ourselves, vegetarians or otherwise, dependent upon the vegetable kingdom and on foods other than meat for a large part of our food supply. As has been said, meat contains all necessary protein, but during the process of digestion, the meat fiber must become disintegrated and the protein elements dissolved out and reduced to the before-mentioned elemental substances just the same as if the protein had been taken in some other form. After absorption these amino acids, or "building stones," or "letters of the protein alphabet," as they are sometimes called, are put together again to form the different kinds of body tissue, or to form, if you please, the complete epistle of the human organism. (See Chapter VI.) The origin of these amino acids, whether animal or vegetable, matters not. After being separated by digestion, they stand side by side unrecognizable as to source. The only question of importance is, Is there an adequate supply of each of the necessary eighteen "building stones"? or is there a sufficient number of each of the protein letters so that the body epistle may be properly written?

Therefore, if we can be certain that our diet contains all essential protein material, both as to quality and as to quantity, we can reasonably draw the conclusion that, whether or not it is meat when we partake of it, is of

little consequence. And it is evident that, if a diet can be devised apart from meat that will supply to the system a sufficient amount of complete proteins, meat will be proved unnecessary.

### Value of Vegetable Proteins

This has indeed been very conclusively shown. Students of nutrition now tell us that without a doubt it is quite possible to obtain sufficient and complete proteins without the use of flesh foods. Experimental evidence abounds to show that the proteins of milk, eggs, and of leafy vegetables as well, are of at least as good a quality as those of meat, and that in a large number of cases they are more readily utilized by the body. Milk and the leafy vegetables stand side by side as so-called "protective foods" in that they insure an easily available supply of complete proteins as well as an ample amount of vitamines and mineral salts. These, combined with the proteins of legumes and cereals, make it possible to supply the necessary quality as well as the required quantity.

### Discussion III — Economy

The question of economy, both personal and for the nation at large, leads us to question carefully the advisability of the use of so large an amount of flesh food as is yearly consumed by the American people. Our recent food conservation campaign has taught us the extravagance of feeding so much of food grains to animals and then eating the animal. Dairy products are much more vitally necessary than is meat. Meat can in no way be said to take the place of milk as a food. A shortage of milk is ever a disaster. "A well-nourished cow, during a year will give in the form of milk as much protein and two and a half times as many calories as are contained in her own body." What a shame, then,

to kill the cow for food and stop the supply of milk which in another year's time would more than equal the food value of her own body, with still the source of supply for other years to come.

Dr. Graham Lusk says: "Everything should be done to conserve our herds of cows for the increased supply of whole milk." And again: "Let no family (of five persons) buy meat until it has bought three quarts of milk, the cheapest protein food." In general, twice as much meat is used as is right; for to produce meat, requires much fodder which might better be used for milk production."— *Address given at the National Museum, Washington, D. C., Aug. 30, 1917.*

### Why Choose Second-hand Foods?

The food emergency arising as the result of the war, was met in perhaps the most satisfactory way by the Danes. Their plan consisted in reserving the available cereals, as well as a large proportion of the potatoes grown in Denmark, for the people themselves, instead of feeding them to the domestic animals, particularly cattle and hogs. This soon greatly reduced the supply of meat, and the Danish people thrived on the diet of vegetables and dairy products thus saved to them. When it has been conclusively shown that the human organism can utilize vegetable products *first hand,* what is the advantage, I ask, of the added expense resulting from the feeding of these natural foods, first to animals, and then our taking them *second hand,* as it were, through the flesh of the animal?

The war, with its demands for rigid economy, is over, but the question of feeding the world remains a live one and the high cost of living a personal problem with us all. Economy consists in spending "not less, but more wisely," and may not the decision to derive our

protein food from a less expensive source be one practical way of helping to solve the problem.

Some may say, "But is not milk expensive, and almost as much so as meat?" Yes, too true, but milk furnishes us, besides its protein, many things that meat does not. We get "more for our money," and a reduction in the use of meat would help greatly in lessening the cost of milk. Then, too, few realize the great value of leafy vegetables as regards their complete proteins, and that an intelligent use of these will help to supplement the somewhat incomplete proteins of cereals and legumes. Now is the time to know foods and their values.

### Discussion IV — Purity

So far so good. We have found that meat may become unnecessary from the standpoint of gastronomic desire or of body need; in these days of the high cost of living we find so many other ways of spending our money that why need the question be considered further? However, for the sake of those who, because of education, habit, and cultivated taste are being "convinced against their will," we will proceed still further:

Two classes of foodstuffs are available to every one of us: First, that which is clean, pure, and wholesome, at the same time wholly adequate for body needs; second, that which is impure and tainted,— food, that while supplying valuable food principles, supplies them in combination with impurities of various kinds, introducing into the system, along with the food, poisons and filth. These are a great handicap to a digestive tract in its effort to prepare food for absorption; to a liver, doing its utmost to filter out from the food-ladened blood all poisons absorbed from the digestive tract; and to the circulating fluids of the body, in their effort to keep themselves free from impurities as they carry nutri-

ment to the cells and tissues. When possible to obtain food that is pure and uncontaminated, why should there be any hesitancy in the choice?

### Clean and Unclean

The time was when flesh food was divided into two classes, "clean and unclean." Today it is no longer possible to do this; animals, fish, and fowl are alike tainted with disease, disease germs, and poisons. A large amount of meat put out for food has been taken from carcasses parts of which have been rejected because of disease. According to statistics, where one carcass is rejected entire, three to ten are rejected in part, the other portion being put on the market.

Post-mortem condemnations for one year in the United States were:

| | Rejected Entire | Rejected in Part |
|---|---|---|
| Cattle | 35,103 | 99,739 |
| Swine | 86,912 | 799,300 |
| Sheep | 10,714 | 170 |
| Goats | 82 | 1 |

Note the number of carcasses rejected only in part, indicating that the remaining portions were retained as fit for food.

Inflammations, abscess, tumor, or tuberculosis, in one part of the animal's body, is not necessarily considered sufficient reason for the rejection of the entire carcass.

And again, "Of some five hundred livers in one lot, only forty were, according to the testimony of one inspector, considered good enough for export. The rest were *reserved for home consumption*." These things are to be said of meats most carefully inspected. In out-of-the-way places and smaller, carelessly inspected slaughterhouses, it may be left to the imagination as

to the character of the meat sold. We quote the following:

### Slaughterhouses

"At nearly all slaughterhouses inspected, foul, nauseating odors filled the air for yards around. Swarms of flies filled the air and the buildings and covered the carcasses which were hung up to cool. Beneath the houses was to be found a thin mud, or a mixture of blood and earth, churned by hogs, which were kept to feed upon the offal. Maggots frequently existed in numbers so great as to cause a visible movement in the mud. Water for washing the meat was frequently drawn from dug wells which received seepage of the slaughterhouse yards, or the water was taken from the adjoining streams, to which the hogs had access. Dilapidated buildings were the usual thing, and always the most repulsive surroundings and odors existed." — *Slaughterhouse Inspector of Indiana. Government Bulletin.*

Many frankfurters and Bolognas are said to consist largely of horse meat, immature veal, and decrepit and sick cows, tuberculous and otherwise. Prepared sausage casings have been found to contain about five grams (about a teaspoonful) of excrement per meter.

### Pork

Pork, of all meats, is especially unfit for food. Filth is the hog's natural element, and it is impossible for its flesh to be wholesome. Its flesh often swarms with parasites, and trichinosis caused by the eating of incompletely cooked pork, is too well known to need discussion.

### Fish and Fowl

Fish may become contaminated by the filth on which they feed. Having come in contact with the sewage of large cities, they may pass into distant waters and be

caught where the water is pure and fresh. In purchasing fish from the market it is impossible to know their source. It is a very common occurrence to find fish fresh from the market or fish wagon with worms crawling out of their flesh.

Thirty per cent of oysters, five miles from sewer outlets, contain the colon bacillus, a germ whose habitat is the human intestinal tract.

"Not long ago the Metropolitan Sewage Commission of New York and the Merchants' Association made an exhaustive investigation of waters and oyster beds surrounding New York, and reported the harbor to be one vast cesspool, foul with disease germs and undissolved sewage matter. Two million oysters were taken annually from these waters." — *National Food Magazine.*

"The pernicious practice of fattening oysters on sewage has been the cause of untold deaths from typhoid fever in the past." — *Roberts.*

Those who have to do with the raising of chickens know how commonly they may be diseased, and that in partaking of even this meat a risk is run of taking that which is unwholesome and impure because of disease. Animals of any kind may be apparently well and yet have disease in their systems and be killed for food just before the symptoms of the disease manifest themselves. It is absolutely impossible to be always certain that any animal at the time of its slaughter is free from disease which perhaps has not yet manifested itself outwardly.

### A Wise Provision

Meat as ordinarily prepared and eaten, even though from healthy animals, can hardly be considered pure food. Instructions to the Israelites controlling their preparation and use of meat, enjoined them not to eat the blood. Harrington and Richardson's "Practical

Hygiene" says: "The Jewish method of slaughtering is regarded by many as far superior to any other. According to Dembo, it is most rational from a hygienic standpoint, since the animal is bled rapidly and completely." So meat, if eaten at all, should be thoroughly cleansed from all its juices, which, for many, would detract greatly from its desirability.

### Egg Tea

When meat juices are eaten, there are introduced into the organism poisonous wastes which would have been eliminated through the kidneys had the animal lived. We quote the following from Dr. A. L. Benedict, in the *Journal of the American Medical Association:* "A meat broth . . . contains salts, extractives which are mainly excrementitious, and a little gelatin, as well as some melted fat, although the last is often skimmed off to make the broth more pleasant and palatable. In so far as protein is concerned, a meat tea made by boiling cannot be more nourishing than egg tea, that is to say, the water in which eggs are poached; or in plain words, it contains no protein nourishment at all and is, barring certain qualitative and quantitative differences, of the same dietetic value as urine."

These wastes are much the same as the caffeine of tea and coffee, with some of their stimulating action. So, one leaving off flesh food often misses this stimulation and thinks he must have meat to give him strength. These wastes impose upon the body processes great handicap, in the caring for and elimination of them, in addition to like wastes normally present as a result of tissue processes.

### Decomposition

Putrefactive processes also play a part in the deterioration of flesh food. The ever-present germ be-

gins its work upon the flesh of the animal as soon as life is extinct, and decomposition begins immediately. The products of putrefaction are not all poisonous, but very often deadly poisons are formed; and poisoning produced by decayed meat and fish is not an unknown occurrence. This form of poisoning is known as ptomaine poisoning, ptomaines being organic bases resulting from the activity of bacteria on nitrogenous matter. These ptomaines may be formed, after the meat is eaten, through changes occurring in the intestines as a result of the excess of protein and the stagnation in the bowel. However, decomposition has, in most cases, progressed to a great extent before the meat is eaten. Often meat is not considered ready to eat until it has reached a certain stage of putrefaction and perhaps is ready to fall to pieces.

### Ripe Meat

Food Inspector Dodge, of the District of Columbia, testified that families of social prominence in Washington preferred "ripe" meat because it was more tender. "Many savage peoples prefer putrid fish and meat, and the more rotten it is, the greater their enjoyment in its consumption. In less degree, the same is true of many of the most enlightened people, who prefer game when decomposition is fairly well advanced." — *Harrington and Richardson's "Practical Hygiene," edition 1911, p. 66.*

In however good condition meat may be taken, it is very liable to putrefaction in the intestinal tract. It has been estimated by competent observers that, of the flesh food eaten, one tenth to one seventh putrefies or rots in the intestine. This may greatly increase a tendency toward intestinal toxemia or auto-intoxication.

As our imagination becomes active, it is not difficult to imagine a state of mind in which the thought of

meat as a food becomes absolutely distasteful, with, indeed, a sense of relief when it is established beyond doubt that meat is in no way necessary for food; for it is from the esthetic viewpoint that we are most easily influenced, perhaps, in spite of the fact that, theoretically at least, we are desirous of maintaining ourselves in health, and of avoiding disease. But in order that the discussion of our subject may be complete, we will continue a little further.

### Discussion V — Excess

The excess of protein often resulting from a meat diet may be a factor in the production of the condition which we have called suboxidation (see Chapter IV). The metabolism of protein results in the formation of a solid ash (see page 28), and when too much protein is eaten, this ash may become excessive, producing "clinkers" which, as they tend to clog the body stove, help to produce such conditions as rheumatism, gout, sciatica, high blood pressure, etc. Under these conditions the kidneys, in their effort to eliminate the excess of nitrogen in the form of this incompletely oxidized ash, are overworked and often become diseased. Professor Quine, dean of the Medical Department of the University of Illinois, said: "Where one man dies of Bright's disease due to chronic alcoholism, fifty men die of Bright's disease due to an excess of protein food, especially meat."

### Meat as a Fuel

The fires of the system must burn more vigorously in order to oxidize protein, and protein seems to stimulate this vigorous oxidation which, of itself, is a benefit. But when an excess of protein is taken, we may find the body fires in the condition expressed as follows by Dr. Hindhede, the great Danish dietetic authority:

"Meat is a fierce burning fuel, but it seems to burn out the oven itself in the long run."

### A Physiological Economy

Says Dr. Winfield Hall, professor of physiology, Northwestern University Medical School: "Body weight, health, strength, mental and physical vigor, and endurance can be maintained with at least one half the protein food ordinarily consumed. A kind of physiological economy which, however, if once entered upon intelligently entails no hardship, but brings with it an actual betterment in health."

Lest a few may still doubt as to the necessity for meat in the diet, we will give the following quotations in regard to experiments which have been conducted for the purpose of clearing up this very point:

### Physical Superiority

"Comparative experiments on seventeen vegetarians and twenty-five meat eaters in the laboratory of the University of Brussels, have shown little difference in strength between the two classes, but a marked superiority of the vegetarians in point of endurance. The average superiority was 53 per cent. The vegetarians recuperated from fatigue more quickly than the meat eaters." — *Irving Fisher.*

"Fourteen meat eaters and eight vegetarians started out on a seventy-mile walking match. All the vegetarians reached the goal in splendid condition, the first covering the distance in fourteen and a quarter hours. An hour after the last vegetarian came in the first meat eater came in, and he was completely exhausted. He was also the last meat eater, for all the rest had dropped off after thirty miles of endeavor." — *Idem.*

Dr. Graham Lusk says: "The popular idea of the necessity of meat for a laboring man may be epitomized

in the statement: 'A strong man can eat more meat than a weak one, hence meat makes a man strong.' The proposition is evidently absurd." — *Address given at the National Museum, Washington, D. C., Aug. 30, 1917.*

There are other reasons that might be given as to the advantage of a fleshless diet; much more could be written, but we lack time and space. The unprejudiced individual may find much to persuade him that a well-balanced vegetarian diet has much to recommend it over that of one including meat. All that most people need is re-education as regards eating, and they will be happier and live longer. Many have tried vegetarianism and failed — not because meat is essential, but because they have not understood food essentials and how they should be supplied. To the one who adopts the fleshless diet intelligently and with as reasonable a knowledge of how to feed himself as he would expect to have in regard to feeding his hens, or cows, were he raising them, will be added health, happiness, and length of days, with keener enjoyment in eating as well.

*" The fleshless diet is practical and rational. It should be accepted and commended by those who pursue the ideal of the formation and education of gentle, intelligent, artistic, and nevertheless prolific, vigorous, and active races."— Gautier, in " Diet and Dietetics," p. 413.*

# CHAPTER XVI

## CONDIMENTS

A TWOFOLD purpose is accomplished in eating: First, the supplying of a physiological need; second, the enjoyment resulting from the partaking of pleasant food. Physiologic need being supplied, hunger disappears and appetite wanes, but humanity, so keen to surfeit itself with pleasure, has tended to tempt the fleeting appetite with foods so prepared that they may appeal to the palate even after the needs of the body are supplied.

### Taste Buds

This having been for so long the tendency of mankind, we find ourselves caring most for those things artificially and excessively seasoned, and so, often depend upon the seasoning rather than upon the natural flavor. In fact, few have taste buds [1] so sensitive that they are able fully to appreciate the exquisite flavors of the foods so wonderfully supplied by nature.

It has been said that given any article capable of disintegration by the teeth, plus the various condiments and seasonings known to the modern chef, a dish fit for a king may be evolved. So with peppers and sauces, with frying and basting, our food is set before us in such a form that it is often impossible for us to tell of what we are eating.

### Eating for Drunkenness

As "overflavoring leads to overeating," the custom of serving richly and highly seasoned food undoubtedly

[1] Sensory nerve endings on the tongue and palate that provide the sense of taste.

has much to do with the too prevalent dietetic sin of eating for drunkenness rather than strength. To reeducate our sense of taste that it might be normally sensitive to nature's exquisite flavors would, if we could but realize it, give us the keener enjoyment and prevent the suffering of penalties for the breaking of natural law.

### A Protection

The mucous lining of the digestive tract has two very important functions: First, to secrete the digestive fluids; second, to produce mucus, which is a natural lubricant and protects the delicate membrane from the mechanical friction of food itself or from any other irritation which might enter it from the outside world.

### Quantity Rather than Quality

Condiments, such as mustard, pepper, vinegar, etc., by reason of their irritating effect, produce a congestion of the mucous membranes with which they come in contact. This temporarily increases the flow of digestive juice, but analysis has shown that the character of this fluid is quite different from that produced as the result of the presence of food unassociated with condiments. An analysis of the salivary secretions following the introduction into the mouth of peppered food, shows an increase in the quantity but a lowering of the quality. Though there is more saliva, it contains less ptyalin (the active digestive principle) and more mucus. Consequently it is weak in digestive power.

Just so in the stomach and intestine; and as the result of repeated irritations of this kind, the little cells whose duty it is to secrete mucus, in their effort to protect against an ever-increasing irritation, secrete more and more mucus and to a greater or less degree crowd out the cells that normally secrete digestive

juices. The mucous glands increase in number and size, the digestive glands grow fewer, the mucous membrane thickens, becomes calloused, as it were, until, as the months and years go by, catarrh of the stomach (or bowel) often results, with a "corn" in the stomach instead of on the foot. The cause is the same: a long-continued abnormal irritation and an effort on the part of the epithelial wall to protect itself — one is analogous to the other, but the first is far more disastrous and as difficult to cure.

But the deleterious effect of condiments does not stop here: the irritants are absorbed, enter the portal system, produce chronic congestion of the liver, and, in their elimination through the kidneys, cause the same irritation in those organs, with consequent thickening and scar tissue formation. Especially objectionable are those articles hardened and preserved in brine and vinegar as pickles. As the vinegar preserves the cucumber, so do these irritants toughen and pickle the tissues, and in addition to the irritation of the condiment is added the indigestibility of the toughened article of food.

## Vinegar Versus Lemon Juice

Vinegar differs from lemon juice in that it is a free acid, being a solution of acetic acid. It is a decomposition product of alcohol, the result of two fermentative processes, and because of its irritating properties, produces disease; while lemon juice is not a free acid, but an acid salt, not a decomposition product but is built up in nature's laboratory, full of vitamines, and a cure for scurvy and many cases of malnutrition.

Some one has well said that "mustard produces the same effect upon the *inside* as it does on the *outside* of the stomach."

Says Gautier: "Pepper irritates the digestive tract and the urinary tract."

### An Inflammatory Thirst

Condiments create an inflammatory thirst which water cannot quench; alcohol is able to quench that thirst, and many a man who had "signed the pledge" has been sent back to the saloon, impelled by a thirst stimulated by highly seasoned foods served to him by the very ones, perhaps, who would, if they but knew how, save him from his overwhelming temptation.

"Many mothers who deplore the intemperance which they see everywhere do not look deep enough to see the cause. They are daily preparing a variety of dishes which tempt the appetite and encourage overeating. The tables of our American people are generally prepared in a way to produce drunkards."—*Ellen G. White.*

### Disease or Health

And a still greater "cloud of witnesses" might be raised up against these much-used articles. But enough has been presented to cause the thoughtful mother and housewife to hesitate before serving to her family foods so seasoned that, even though the immediate effect may seem pleasing and satisfactory, a foundation for disease rather than for health is being laid, and, in some cases at least, a thirst created that may lead to a more grievous form of intemperance, with its train of misery and woe.

### How Much Reserve?

While catarrh of the stomach and bowels, hardening of the liver, and Bright's disease are not in every case caused by the use of condiments, nevertheless these things are factors in the production of these ever-increasing diseases, and shorten the working life of

these organs. Again we would lay emphasis upon the fact that the reserve strength of a healthy organ cannot be estimated. Just how much wear and tear and overstrain it may be able to endure we can never know until it has been tried out, and then it is often too late; the damage is already done. It is not one error that brings disease. Nature may resist and override the few occasional mistakes, but a combination of factors, a continued irritation from various sources, is bound even in those most vigorous to bring all too soon the time of reckoning and the day when the strength of the organs no longer enables them to cope with the adverse conditions. And their ability to do even a normal amount of work is often so greatly impaired that the individual must walk, with a crutch, as it were, permanently maimed, his vitality lessened and his life shortened.

An important part of the treatment of the diseases mentioned in this connection is the elimination from the diet of all irritating and highly seasoned foods. How much better to avoid those things which tend to produce disease and to let our regular dietary consist of the foods so bountifully supplied by nature,— the natural foods that will place upon our bodies no handicap in the processes of assimilation and elimination.

## Keen Enjoyment

There are many delicious flavors in natural foods; the delightful nectar of fruits, the rich flavor of nuts, the wholesomeness of grains, the savor of vegetables and vegetable broths,— all of these were given us that we might derive the keenest enjoyment in the partaking of them. Careful and intelligent preparation will bring out delicacy of flavor that will prove delightful and more than satisfactory to all who will give the healthful way an unprejudiced trial.

# CHAPTER XVII

## UNNATURAL STIMULANTS

UNNATURAL stimulants are any substances which excite cell or tissue to undue activity by reason of their irritating presence. Condiments would be included under this head, but as they have already been discussed (see previous chapter), we shall devote the contents of this chapter to those stimulants which affect the nervous system. These are substances which excite the brain and nerves to abnormal activity by reason of their irritating presence in the blood. This undue stimulation is always followed by a compensatory period of depression. This is more than a mere physiological sedation, for after repeated stimulation of this sort it takes more of the stimulant to produce the same amount of activity, until the nerves tend toward a worn-out state or a condition of exhaustion.

Exhausted nerves are always irritable, and as the end result of a continued abnormal stimulation the nerves become weak, unsteady, and unable to do with poise and control the work of governing the muscular mechanism of the body. Under the head of such stimulants may be classed: Alcohol, tobacco, various drugs, many patent medicines, tea, coffee, cocoa, and meat juices.

Alcohol, the great destroyer of the race, we need not discuss here. Tobacco, a menace to the physical and intellectual integrity of mankind, is not included in the realm of dietetics. The promiscuous use of drugs and patent medicines the people are being, to an extent, saved from by educational campaigns and the law. But coming more strictly in the province of our dis-

cussion, and often apparently innocent in their effects, are those in the remainder of the list — tea, coffee, cocoa, and meat juices.

*Tea:* " That social cup which sharpens wit, brightens repartee, accelerates the flow of ideas, quickens the pulse, relieves one of headache and fatigue, and drives away dull care, is not the innocent benefactor of the race that it may seem to be. Instead, it is a deceiver which, commending itself for the present as a thing 'to be desired to make one wise' and well, in the end robs one of a hundredfold more of the very things it seems to give." — *D. D. Comstock, M. D., in Signs of the Times, July, 1917.*

## Theine

Tea contains two injurious extractives — a somewhat bitter alkaloidal poison called theine, and an astringent acid called tannin. A small cup of tea — four ounces — will contain from one-half to one grain of theine and a variable amount of tannic acid. The physiological effects of theine are principally those of stimulation. It is an excitant to the brain, quickens the pulse, and raises blood pressure, apparently relieving fatigue.

" Used in excess, it [tea] exerts a harmful influence upon the nervous system, and in too strong a form injures the digestive tract and function." — *Harrington and Richardson's " Practical Hygiene," edition 1911, p. 212.*

According to Bullard, " the abuse of tea as a beverage leads to ringing in the ears, tremor, nervousness, headache, neuralgia, and constipation."

## A Habit-Forming Drug

Practically all medical authorities classify theine with the habit-forming drugs, such as morphine, cocaine, and alcohol. Who shall say, then, just what is excess or

abuse? Experiments of the Pasteur Institute have shown that the long-continued use of even very small doses of poison ultimately produces decided injury to the organism, and some observers say that a given amount of poison taken in small doses over a long period of time does more harm than if taken in large doses at infrequent intervals,— just as there is greater damage inflicted by alcohol on the "tippler" than on the man who goes on a "spree" occasionally, but abstains at other times.

The astringent action of the tannic acid of tea in its effect on the bowel is no small factor in the causation of the prevalent disease, constipation, and many a girl and young woman has laid the foundation for future ill health in her daily indulgence in a cup of tea.

### A Tragedy

"With nerves all a-quiver with theine, and the bowels all puckered with tannin, what an amazing preparation for the battles of life! It is but little short of a tragedy that a girl of a nervous and artistic temperament, with a natural tendency toward functional disease of the nervous system, should be encouraged or even allowed by her parents to begin so young to cultivate a disorder toward which she has a natural bent,— nervous prostration and chronic constipation,— through the free use of tea and other nerve stimulants and sedatives." — *D. D. Comstock, M. D.*

### Caffeine

*Coffee:* The stimulating principle of coffee is caffeine, which is practically the same as the theine of tea, and identical in its effects, and much that has been said of tea might also be said of coffee. Caffeine is a drug that is commonly used in headache powders or is prescribed by physicians when an emergency stimulant is needed.

Coffee contains about 2 grains of caffeine to the cup, and thus its effect upon the nervous system is even more marked than that of tea; and while tea, because of its astringent action, interferes with the normal peristalsis of the intestine, coffee interferes to a greater extent with stomach digestion.

### 15,000,000 Pounds

American people yearly consume about 15,000,000 pounds of caffeine, which if given at one time would kill the whole world at one dose. This, if divided into doses, would equal more than 100,000,000,000 doses annually, or a little more than 3 grains daily for every man, woman, and child in the nation. Surely this cannot tend toward the physical uplift of the race, but must have its effect in the gradual increase of chronic disease.

Quoting from Gautier: "Coffee, as everybody knows, produces a nervous excitement, which if abused may lead to insomnia, hallucinations, troubles of the circulation, and muscular enervation, to pericardial distress and to dyspnea. One can become caffeic, just as one can become alcoholic or a morphia maniac."

And again from Harrington and Richardson's "Practical Hygiene," edition 1911, page 214: "Taken in excessive quantities, it [coffee] causes palpitation and intermittence, besides general nervousness and derangement of digestion. It has a marked inhibitory influence on gastric digestion, and is more oppressive to the stomach than tea, and, hence, should be used with caution by dyspeptics."

### For That Headache

The headache that one has when deprived of his morning coffee or his daily portion of tea, is one of the greatest evidences that the nervous system has learned

to depend upon the artificial stimulation, and that, sooner or later, if the habit is continued, nature will reach the place where she can no longer cope with the situation, and the collapse will come.

"There can be no doubt that the human race would be better off if these beverages had never been discovered; and many cases of nervousness, dyspepsia, and constipation would be either greatly helped or entirely relieved if these beverages were banished from our tables." — "*The Science of Living*," *Sadler, p. 162.*

### Theobromine

*Cocoa:* Many giving up tea and coffee feel that they can indulge themselves freely in cocoa, but here again a mistake is made; for even in the use of this delightful beverage, care and moderation should be exercised. It contains the active principle theobromine, which is related to caffeine, though not so deleterious in its effects, it not having the untoward effect on the cerebral centers and the heart that does the active principle of either coffee or tea. However, it is a drug, its drug action affecting principally the kidneys and urinary tract. A cup of cocoa contains about one half as much of its active principle as does tea or coffee, and the theobromine may be considered one half as injurious in its effects as caffeine.

Cocoa has an advantage over tea and coffee. Being rich in fat and protein, it has rather a high food value. Chocolate and cocoa are the same, except that in cocoa the fat has been largely removed. This fat is placed on the market as cocoa butter.

So while not so much can be said against cocoa as can be said against tea and coffee, and it may at times serve a useful purpose as food, yet it should be used only with care and moderation. Especially should

children be kept from the use of cocoa, it being particularly deleterious to them because of its action on the urinary tract.

### Little Foxes

Truly it is "the little foxes that spoil the vines," and our safety and greatest efficiency lie in a selection of food which will yield the highest results healthwise, and in the avoiding of those things which are questionable in their effects.

*Meat Extractives:* The end products of protein metabolism already described are closely related to caffeine; hence the stimulating effect of meat and meat broths, which, when taken, add these extractives in excess to those already formed normally in the tissues, and the sensation of weakness when they are omitted from the dietary by one accustomed to having them.

### A Devitalizing Effect

The feeling of strength obtained from meat broths is thus not a true tonic, but an unnatural stimulant, which if freely indulged in cannot but have in the end a devitalizing effect upon the general nervous system.

Eating for health means eliminating from one's diet those things which tend to make for disease and race decadence, and subsisting on those foods so abundant that are full of life and health properties. The more we are able to reach this ideal the nearer does the body approach the normal state, which means not only fulness of physical but of intellectual strength.

*"Blessed art thou, O land, when . . . thy princes eat in due season, for strength, and not for drunkenness."— Bible.*

# CHAPTER XVIII

## DESSERTS

### Insult Added to Injury

THIS most pleasing part of our meal comes to us, usually, when hunger is satisfied and the needs of the body have been supplied by that part which has gone before. Thus the digestive powers are overtaxed, the body is burdened by an excess of food, and actual harm is often done, though the dish might of itself be wholesome. However, desserts are frequently not wholesome, and then the food which is imposed upon an already more than satisfied stomach is of such a quality that insult is added to injury.

The so-called best chef is the one who can make a dessert so tempting that it will appeal to the palate of one who is already surfeited with food, and again we are reminded of the frequency with which the question of supplying physiological need is lost sight of in the desire to cater to the sense appeal. When one is truly hungry, it is not the dessert that satisfies, but the homelier part of the meal, and the tendency is to wait until the appetite wanes before partaking of that which is often of the most concentrated food value.

The best desserts are light, easily digested, and of a minimum caloric value. They must not be of such concentration that they interfere with the proper food balance. If the first part of the meal is low in calories and it is planned that the dessert supply a large part of the food value, making with the remainder of the food served a proper balance, a more concentrated dessert may be served, e. g., the following:

| | Protein Calories | Total Calories |
|---|---|---|
| Cottage cheese, 2 ounces | 40 | 75 |
| Spinach, 2 heaping tablespoons | 8 | 25 |
| Apple pie, one sixth of a pie | 16 | 350 |
| Walnuts (6) | 20 | 200 |
| Glass of milk | 28 | 150 |
| | 112 | 800 |

Per cent of protein for the meal, 14.

### The Proper Food Balance Maintained

Note the ample total food units, and the protein — half the daily needs, in spite of the fact that the pie contains only 4½ per cent protein. The low protein of the pie is made up by the high protein content of the other food. While pie may not be considered the most wholesome of desserts and would better be served only occasionally, yet much of its unhealthfulness is avoided when it is given its rightful place in the meal. The pie and nuts, making a dessert of 550 calories, would undoubtedly be a great imposition upon a digestive tract after the ordinary dinner of three or four courses. This would in reality be serving a second full meal when the digestive organs already have all they can do.

Usually the dessert of 150 food units or less is the best, and many very delightful dishes of this kind can be prepared. (See recipes, Chapter XXXI.)

### A Disadvantage

One great disadvantage in desserts is the large amount of fat and sugar of which they are usually made. If care is not taken, this will result in a meal overbalanced as regards its carbohydrate and fat content, at the same time irritating because of its concentrated sweet and overheated fat, and more or less

indigestible, especially if added to an already overloaded stomach.

### How to Combine

Desserts should be made of food substances in proper combination. For instance, combinations of milk and sugar are not the most wholesome, and greatly increase a tendency to gastric fermentation. (See recipes, Chapter XXXI, for desserts without the milk and sugar combination.) The combination of fruits and vegetables is not considered ideal, and if a fruit dessert is served after a hearty vegetable meal, it should preferably be one in which the cellulose of the fruit has been largely removed.

### Candy

The time for candy is at the end of the meal, at which time it may be served with the dessert. When it takes its place as a part of the meal, its food value being reckoned with the daily ration, one great objection to its use is removed. The appetite already satisfied, the tendency to overeat of it is greatly lessened, and it does not prove so irritating to the mucous membrane when not taken on an empty stomach. However, candy eaten in excess even at this time often results in marked irritation of the throat and increased catarrhal conditions.

### Nuts

Nuts are sometimes served with the dessert, and much blame is often attached to this most valuable article of food because it so often plays a part in the overeating frequently indulged in during this last most delightful course. The high caloric value of nuts must be kept in mind and they should be eaten accordingly. Nuts served with a simple fruit dessert make a most satisfactory combination in which the food concentration need not be too great. Nuts often cause distress because they

are improperly masticated. If thoroughly chewed and eaten moderately, as all concentrated foods should be; if eaten at the proper time and place and considered a food with actual food value instead of something merely to please the palate, this pleasing as well as nourishing food may be eaten by nearly every one with no unsatisfactory results.

### Ice Cream

Ice cream, so often served, should be mentioned, and the same rules apply to this as to all others. It must be eaten with due regard for what has preceded it. Because of its combination and concentration, it cannot be considered as wholly without objection, but if eaten in moderation and slowly so that large ice-cold masses are not thrown upon the stomach at once, thus too quickly lowering the temperature below that at which digestion can be carried on, it need not be condemned. As a dessert it is much to be preferred to the rich puddings and pastries so often served. A good time for ice cream is at lunch when little else is taken. A plain cracker eaten with ice cream makes a more rational combination than the conventional cake. Sometimes an invalid can take ice cream better than anything else. At these times it is usually served by itself and supplies needed nourishment. Melted before it reaches the stomach, it is little more than a liquid and is usually well taken care of.

### Cakes

Rich cakes and pastries are better omitted. Simple cakes, made preferably without baking powder (see recipe 102), may be served occasionally, but as a usual thing, the fewer of these sweets supplied the family table the better. And when for economy's sake, or lack of time, the dessert is forgotten or omitted, none need feel that the body will suffer because of the omission.

# CHAPTER XIX

## MEAT SUBSTITUTES AND SUGGESTIVE MENUS

UPON meat and the savors derived from it, dependence has always been placed to make food palatable and appetizing.

With meats taken from us, free fats in disfavor, condiments disallowed, what can we do in the way of preparing dishes that will not only supply the body needs, but will also meet the demands of often wrongly educated palates? Surely we should feel quite helpless and find the problem very difficult to solve. However, a practical study may enable us to "find a way."

### Threefold

In preparing meat substitutes we must think of, (1) broths, (2) meat dishes, and (3) gravies. These foods must be appetizing. The broths should have something of the same savory appeal to the palate as have the meat juices; the meat dishes must supply the necessary amount of tissue-building element; and the gravies, while palatable, must be free from excess of grease, especially superheated fats.

### A Natural Tonic

1. *Broths and Soups.*— Vegetables, properly prepared, yield the most delicious and appetizing flavors. In fact, vegetable bouillon may be so like the ordinary meat broth in its savor that many can scarcely be persuaded of the absence of all meat extract in its preparation. Moreover, such vegetable broths are rich in the mineral salts and vitamines so essential. For the invalid they will have all the advantages of an appe-

tizer and tonic without the contamination of animal wastes and purine stimulation.

The vegetables, having been cut up without paring, should be put to cook in cold, unsalted water and allowed to simmer two or three hours. In this way the mineral matter, vitamines, and much of the protein pass into the broth, the temperature probably not greatly affecting the vitamines. (See page 107.) In boiling vigorously for that length of time a greater risk is run of destroying the vital elements.

## Soup Stock

The most important part of the nourishment being near the skin, a most nutritious vegetable broth can be made by using simply the parings of potatoes and other vegetables. (See recipe 24.) These, having been thoroughly cleansed, may be used to excellent advantage in the preparation of broths and soup stock. No fat should be added, but after straining or pressing through a colander, seasoning in the way of salt, celery salt, a bay leaf, or a pinch of thyme, may be added. Any combination of vegetables may be used with good results, and the water from any vegetable may be added to these, to make a delicious vegetable broth, or it may be used by itself. For example, instead of throwing away cauliflower water, add it to the soup or broth already made, or serve it by itself, hot and salted to taste, in bouillon cups. It will make a pleasing addition to the meal.

## Tea or Leaves, Which?

Likewise may be used the water from string beans, asparagus, and from even cabbage or beets. Some of these may need to be combined in various ways to insure a good flavor, but always should be used. What tea lover would eat the tea leaves and throw the tea

down the sink? Potato water, bean broth, alone or together, seasoned by cooking with them a bit of celery, onion, and tomato, give a flavor which may rival that of a consommé. The ingenuity of the housewife makes possible any number of the most savory and delightful combinations.

Vegex, also herbex, is a factory-prepared vegetable extract which makes, when added to boiling water, a very good bouillon comparable to that prepared from bouillon cubes. (See recipe 39.)

A very meaty flavor may be given vegetable soups and purées by using as a basis a stock prepared as in recipe 25.

### An Essential

2. *Substitute Meat Dishes.*— The essential for these dishes as meat substitutes is, first, that they contain a relatively high proportion of protein. In this way only can they replace flesh food, which usually contains 30 per cent or more of the nitrogenous element. Often dishes are served as meat substitutes which contain a very small percentage of protein, and are, in reality, starchy rather than nitrogenous foods. Something more than the taste must be considered if we are rightly to supply the body demand. However, the flavor cannot be ignored, and the dish, to be a success, must satisfy the palate as well. For foods that, because of their large protein content, are good meat substitutes, see table, Chapter VI.

### For Breakfast

For at least two of the daily meals, a protein dish should be planned. For breakfast it may be an egg, cottage cheese, cottage cheese omelet, milk toast, gluten mush or gruel, or any of the whole grains, as oatmeal, whole or cracked wheat, whole rice, pearled barley.

These grains contain in themselves 15 per cent or more protein. When eaten with milk, the protein may reach 18 per cent. The addition of sugar is a mistake for two reasons: First, because sugar and milk are not a good combination (see Chapter XX); and second, because the extra food units of sugar greatly disturb the protein balance. Cream may be used if other fats in the meal are limited, but as a protein dish the cereal has its greatest advantage when eaten with whole milk.

No better change can be made in the breakfast plan than a cup of hot milk in place of the time-honored cup of coffee. The proverbial breakfast mush may be changed from time to time to a gruel (see recipes 19 and 20), to shredded wheat, or to corn flakes. Baked potato, with an accompanying egg, may well be served at breakfast time, with perhaps a glass of milk. The potato in this case should take the place of breakfast cereal unless in the form of zwieback or breakfast gems. Purée of peas on toast, asparagus tips, or other easily digested vegetable is often good if one does not have dinner until late in the day.

Fresh fruit should form a part of every breakfast, and, as mentioned elsewhere, should be eaten first. In this way the full benefit of the fruit is obtained by the system, and there is less danger of trouble due to the combination. Stewed fruits may be used, as desired, and may be taken during or at the end of the meal. But they should never be allowed, unless of necessity, to take the place of fresh fruit. A fruit salad for breakfast makes a pleasant variation. (See recipe 74.) Nuts are a good addition to the breakfast menu, but supply fat rather than a great deal of protein. The peanut and almond are higher in protein than other nuts.

As five, or better six, hours should elapse between meals, the two-meal-a-day plan would prove a benefit to

many, with, perhaps, a third fruit meal. The ideal plan, were it possible, would be a breakfast at nine and dinner at three or four. This is so rarely possible that one of two or three other plans must be substituted. Many find the no-breakfast plan a good one (or a breakfast of fruit), with an early lunch and an evening dinner. Others will do well with a substantial breakfast, a fruit lunch, and a heavier meal later in the day. Often the best that can be done is breakfast between seven and eight, lunch between twelve and one, and dinner about six.

## For Lunch

In this case the lunch should be light, only of fruit or other easily digested food, as perhaps soup, with zwieback or a sandwich. The dinner should then be eaten as soon after five as possible. If it is possible to serve dinner in the middle of the day, preferably about one, then the evening meal should be light and easy to digest. A fruit meal in the evening is very good, with perhaps zwieback, dextrinized cereal, or vegetable soup.

If one's protein for the other meals of the day has been low, he may well have a hot milk toast, a cream vegetable soup, an egg, or a glass of milk or of buttermilk. However, a simple fruit supper is the one that will insure the best night's rest and the sweetest taste in the morning. Few, except those who are working vigorously with their muscles, can properly digest three hearty meals a day.

Many in trying to do this, especially those in sedentary work, find their systems becoming clogged, with headache, loss of appetite, and other symptoms of stagnant conditions in the digestive tract and tissues. Unfortunately, these people often do not recognize the cause of the trouble.

### For Dinner

The dinner, whether served at midday or evening, should be very carefully planned. It is well to decide first upon the form in which the protein is to be supplied, then to select the other foods accordingly. If legumes, such as peas, beans, or lentils, are to be served, or cottage cheese, either as a salad or a meat dish, it may not be necessary to plan a special meat substitute. However, it is often very pleasing to serve a dish which will seem more nearly to take the place of meat, such as in recipes 41 to 58. These may be served with sauces or gravies which will add greatly to the meaty flavor.

A soup, a raw vegetable salad, one or both, may well form a part of every dinner. If these are served with a good protein dish, one cooked vegetable may be quite sufficient, although a second may be added if desired. If there is no specially prepared salad, something raw should be served, if only celery or lettuce.

Potatoes need not always be included. It may be well on alternate days to serve one or two other vegetables and omit the potato. Potato, while a valuable food, should never be allowed to take the place of green or leafy vegetables. If squash or carrots are served, the second vegetable would better be spinach, string beans, green peas, etc., rather than potato. Many are content to limit the vegetable part of their daily ration to potato, with only exceptional variation. This is a mistake.

Dessert is by no means always necessary, but if served, should be simple. If the dessert is heavy and concentrated as, e. g., pie, the rest of the meal should be light. (See Chapter XVIII.)

The planning of the dinner should depend to a large extent upon whether those who eat of it are farmers,

carpenters, and draymen, or clerks, stenographers, and professional people. Those who work hard at muscular labor can digest food in kind and amount that the brain worker could never take care of. The needs of the two, especially as to the amount of energy food required, are very different.

In planning every dinner, especially for those of the sedentary class, it will be well to remember that the protein portion should average 13 to 15 per cent, or more of the total number of calories, unless the breakfast has been high in protein. This will make up for those meals in which fruit and other foods low in protein constitute a large part.

As has been said before, both classes need about the same amount of protein, but the total calories needed by the first class may in some cases be twice as much as needed by the second. The appetite of the first is often a safe guide, but not so with the second.

*3. Gravies.*— We cannot leave the question of meat substitutes without discussing the question of gravies, those questionable meat accessories so often used to cover up dishes of uncertain source and many times depended upon to insure an appetizing flavor.

### Unhygienic Gravies

Many would be quite willing to eliminate flesh food from their diet were it possible still to have the rich savory gravies usually served with meat. Vegetarians, in their effort to supply something that will take the place of these sauces, often serve gravies which are anything but hygienic because of their excess of grease and superheated fat. These have little advantage over meat gravies in their effect upon the health, and may even make a meal more unhealthful than one in which meat is served.

However, it is very possible to make these desired sauces from vegetable broths and extracts, and have them full of important nutritional elements, health-giving as well as appetizing. A very enjoyable and healthful dressing for vegetables and entrées may be prepared by using a vegetable broth as a basis. Potato water, thickened with flour, and milk or cream added, makes a very delicious milk gravy. In the same way the water from boiled onions, string beans, and other vegetables may be thickened to make cream sauces of various kinds.

In making potato and onion soup stock according to recipe 25, before putting through a colander, pour or strain off a pint or more of the rich brown liquor. Add a little strained tomato to this, just enough to give it a little flavor, not enough to give a tomato color, unless a tomato sauce is desired. Brown flour in the oven or over the flame in a dry pan, *without oil,* and use this flour for thickening. Salt to taste and, if desired, season with celery salt, thyme, or sage. The result will be a brown gravy surprisingly satisfactory as to flavor, and wholesome withal. No fat need be added to this gravy. Milk or cream may be added; but if so, it will be well to omit the tomato. By adding more tomato a delicious tomato sauce may be made. For other recipes, see Chapter XXXI.

There are many ways in which the ingenious housewife can apply the above suggestions, but for those who may wish a little more assistance in the practical working out of these daily problems, we append a few suggestive menus, which, after the housewife has gotten well on in the way of preparing well-balanced and wholesome meals for her family, she may in many ways vary and improve.

## Sample Breakfast Menus

| No. 1 | Protein Calories | Total Calories |
|---|---|---|
| Fruit Salad (see pages 211, 212) | 13 | 181 |
| Oatmeal | 14 | 75 |
| Milk (8 oz.) | 32 | 160 |
| Zwieback | 14 | 100 |
| Dates (4) | 3 | 100 |
| Per cent of protein for the meal, 12. | 76 | 616 |

| No. 2 | Protein Calories | Total Calories |
|---|---|---|
| Orange Juice (7 oz.) | 7 | 100 |
| Whole-wheat Gems (2) | 30 | 192 |
| Butter | .. | 50 |
| Soft Egg | 25 | 75 |
| Prunes (4) | 3 | 100 |
| Almonds (6) | 15 | 100 |
| Per cent of protein for the meal, 13. | 80 | 617 |

| No. 3 | Protein Calories | Total Calories |
|---|---|---|
| Fruit Salad | 13 | 181 |
| Cracked Wheat and Milk | 25 | 164 |
| Whole-wheat Gems | 30 | 192 |
| Butter (thin pat) | .. | 50 |
| Cereal Coffee (teaspoon sugar, 1 oz. evap. milk) | 8 | 65 |
| Almonds (4 or more) | 8 | 60 |
| Per cent of protein for the meal, 12. | 84 | 712 |

| No. 4 | Protein Calories | Total Calories |
|---|---|---|
| Cantaloupe | 5 | 75 |
| Omelet | 27 | 90 |
| Baked Potato | 10 | 100 |
| Corn Bread | 18 | 150 |
| Butter (2 thin pats) | .. | 100 |
| Hot Milk (6 oz.) | 27 | 140 |
| Per cent of protein for the meal, 13. | 87 | 655 |

| No. 5 | Protein Calories | Total Calories |
|---|---|---|
| Grapefruit (1) with teaspoon honey | 7 | 125 |
| Whole or Brown Rice | 25 | 161 |
| Fruit Toast | 15 | 158 |

| | | |
|---|---|---|
| Protose Loaf | 45 | 100 |
| Whole-wheat Sticks (3) | 10 | 100 |
| Per cent of protein for the meal, 15. | 102 | 644 |

| No. 6 | Protein Calories | Total Calories |
|---|---|---|
| Watermelon | 5 | 80 |
| Scrambled Eggs (equivalent to 2 eggs) | 50 | 150 |
| Nut Tomato Toast | 34 | 205 |
| Per cent of protein for the meal, 20. | 89 | 435 |

Here is illustrated a low total with high protein.

| No. 7 | Protein Calories | Total Calories |
|---|---|---|
| Orange Juice (7 oz.) | 7 | 100 |
| Corn Flakes with Milk | 16 | 100 |
| Baked Apple | 2 | 125 |
| Cottage Cheese Omelet | 62 | 170 |
| Graham Zwieback (2) | 26 | 200 |
| Butter (thin pat) | .. | 50 |
| Cereal Coffee with Evaporated Milk and Sugar | 8 | 65 |
| Per cent of protein for the meal, 14. | 121 | 810 |

| No. 8 | Protein Calories | Total Calories |
|---|---|---|
| Fruit (large apple or orange) | 6 | 100 |
| Oat Gruel | 23 | 125 |
| Purée of Peas on Toast | 38 | 200 |
| Graham Puffs (2) | 29 | 170 |
| Butter (thin pat) | .. | 50 |
| Per cent of protein for the meal, 14.5. | 96 | 645 |

| No. 9 | Protein Calories | Total Calories |
|---|---|---|
| Fruit Salad | 20 | 300 |
| Milk Toast | 33 | 200 |
| Poached Egg | 25 | 75 |
| Per cent of protein for the meal, 14. | 78 | 575 |

Butter is allowed in the above menus, but it should ever be remembered that its use may well be minimized and that many times it may be dispensed with entirely, to advantage, without lessening the palatability of the meal.

Other more simple breakfasts may be as follows:

| No. 10 | Protein Calories | Total Calories |
|---|---|---|
| Orange Juice (7 oz.) | 7 | 100 |
| Poached Egg on Toast | 39 | 200 |
| Dates (6) | 4 | 150 |
| Per cent of protein for meal, 11. | 50 | 450 |

The calories for the poached egg on toast include 25 calories of butter.

| No. 11 | Protein Calories | Total Calories |
|---|---|---|
| Whole Grapefruit with Honey | 7 | 150 |
| Shredded Wheat with Milk | 32 | 200 |
| English Walnuts (3) | 10 | 100 |
| Per cent of protein for meal, 11. | 49 | 450 |

| No. 12 | Protein Calories | Total Calories |
|---|---|---|
| Fruit Salad | 13 | 181 |
| Milk Toast | 34 | 200 |
| Per cent of protein for the meal, 12.5. | 47 | 381 |

Graham or whole-wheat zwieback should be used for the toast.

| No. 13 | Protein Calories | Total Calories |
|---|---|---|
| Grapefruit with Honey | 7 | 150 |
| Browned Rice with Milk | 29 | 200 |
| Cream Rolls or Fruit Crackers (3) | 15 | 126 |
| Per cent of protein for meal, 11. | 51 | 476 |

With rather a low per cent of protein for breakfast, the dinner must be planned so as to furnish a larger per cent.

## Sample Dinner Menus

| No. 1 | Protein Calories | Total Calories |
|---|---|---|
| Cream of Pea Soup | 28 | 137 |
| Zwieback | 14 | 100 |
| Cottage Cheese Omelet | 62 | 170 |
| Baked Potato | 13 | 125 |
| Butter | .. | 50 |

| | | |
|---|---|---|
| Cauliflower | 7 | 13 |
| Grated Carrots | 4 | 20 |
| Cocoanut Drop Cakes | 14 | 158 |
| Orange Juice (7 oz.) | 7 | 100 |
| Per cent of protein for the meal, 17. | 149 | 873 |

Prepare soup, omelet, and drop cakes according to recipes 33, 48, and 106. Leave the soup thick enough so that any water from the cauliflower may be added. Make zwieback from Graham or whole-wheat bread. Use butter very moderately. Bake the cottage cheese omelet and potatoes together, in a low oven. The omelet can stay in until the potatoes are ready to serve. Do not remove the omelet from the oven until ready to serve; then serve at once. Add to the omelet the yolks of the eggs used in making the drop cakes. For each individual salad, place in a lettuce leaf two or three tablespoonfuls of grated carrots to which a dressing of lemon juice and salt has been added. Dilute the orange juice very little, if at all; add no sugar unless oranges are very sour; in this case it will be better to dilute the orange juice with a sweeter fruit juice, as grape juice, bottled pineapple juice, or the juice of stewed fruit.

| No. 2 | Protein Calories | Total Calories |
|---|---|---|
| Cream of Celery Soup | 21 | 140 |
| Zwieback | 14 | 100 |
| Shredded Lettuce with Cream Dressing | 10 | 55 |
| Braised Protose | 49 | 110 |
| Mashed Potato with Brown Sauce | 21 | 155 |
| Asparagus Tips | 8 | 25 |
| Stuffed Dates (4) | 8 | 136 |
| Grape Juice (7 oz.) | 2 | 100 |
| Per cent of protein for the meal, 16. | 133 | 821 |

Prepare soup and salad according to recipes 34 and 78 (omitting the tomatoes). Scrub the potatoes thoroughly before paring, and add potato skins to the soup

stock. To make the brown sauce, use a pint of the broth from the soup stock, pouring it off the top before the soup stock is put through the colander. To this brown liquid add a cup of tomato juice, thicken with flour which has been browned in a dry pan, and salt to taste. Cook the tough asparagus ends, and use this water for cooking the asparagus tips. Add any water left from the asparagus to the soup stock.

| No. 3 | Protein Calories | Total Calories |
|---|---|---|
| Cream of Lima Bean Soup | 31 | 146 |
| Zwieback (2) | 28 | 200 |
| Lettuce and Tomato Salad | 7 | 117 |
| Carrot and Nut Loaf with Cream Sauce | 22 | 147 |
| Mashed Turnips | 2 | 7 |
| Prune Whip | 11 | 123 |
| Almonds (6) | 15 | 100 |
| Per cent of protein for the meal, 14. | 116 | 840 |

Prepare soup, salad, and carrot and nut loaf according to recipes 33, 78, and 51. The egg yolks left from the prune whip may be beaten and added to the soup, to cream salad dressing, or to the carrot and nut loaf.

| No. 4 | Protein Calories | Total Calories |
|---|---|---|
| Cream of Tomato Soup | 19 | 112 |
| Zwieback | 14 | 100 |
| Shredded Cabbage with Cream Dressing | 10 | 65 |
| Cottage Cheese with Cream | 40 | 200 |
| Stuffed Potato | 15 | 150 |
| String Beans | 6 | 30 |
| Nuts and Raisins | 12 | 150 |
| Per cent of protein for the meal, 14½. | 116 | 807 |

Prepare cream of tomato soup, salad, and stuffed potatoes according to recipes 27, 79, and 61. Add the water from the string beans to the soup. Serve 2 tablespoons cottage cheese in individual dishes and cover with cream or top milk.

| No. 5 | Protein Calories | Total Calories |
| --- | --- | --- |
| Purée of Green Peas with Tomato Sauce | 33 | 152 |
| Spinach with Egg | 20 | 62 |
| Boiled Potatoes | 10 | 100 |
| Buttermilk (7 oz.) | 28 | 75 |
| Almonds (6) | 15 | 100 |
| Apple Pie | 16 | 350 |
| Per cent of protein for the meal, 15. | 122 | 839 |

Prepare purée of peas and sauce according to recipes 56 and 69. Serve spinach with sliced hard-boiled eggs, and lemon if desired. Before paring the potatoes, scrub them thoroughly and make a broth from the skins to add to the tomato sauce. The pie is allowed because of the simplicity of the meal and its otherwise high protein content.

| No. 6 | Protein Calories | Total Calories |
| --- | --- | --- |
| Browned Potatoes | 19 | 129 |
| Protose Steak or Bean Croquettes | 54 | 192 |
| Baked Carrots | 9 | 54 |
| Combination Salad with Lemon Dressing | 7 | 35 |
| Grape Juice — Sweet Wafers | 6 | 200 |
| Per cent of protein for the meal, 15½. | 95 | 610 |

Follow recipes in Chapter XXXI. The skins of the potatoes should be boiled and the broth added to the sauce for the browned potatoes.

| No. 7 | Protein Calories | Total Calories |
| --- | --- | --- |
| Cream of Corn Soup | 18 | 135 |
| Fresh Tomatoes (or Stewed) | 7 | 33 |
| Baby Limas | 24 | 115 |
| Baked Hubbard Squash | 3 | 43 |
| Milk (7 oz.) | 28 | 140 |
| Caramel Pudding | 5 | 148 |
| Per cent of protein for the meal, 14. | 85 | 614 |

Prepare soup and pudding according to recipes 30 and 107.

| No. 8 | Protein Calories | Total Calories |
|---|---|---|
| Cream of Spinach Soup | 21 | 93 |
| Zwieback (1) | 14 | 100 |
| Cottage Cheese and Nut Roast with Cream Sauce | 40 | 200 |
| Baked Sweet Potatoes | 12 | 206 |
| Celery (3 stalks) | 5 | 20 |
| Olives (5) | 5 | 100 |
| Fruit Salad | 11 | 156 |
| Per cent of protein for the meal, 12½. | 108 | 875 |

For soup, roast, and salad, use recipes 35, 49, and 74.

| No. 9 | Protein Calories | Total Calories |
|---|---|---|
| Vegetable Bouillon | 24 | 93 |
| Zwieback (1) | 14 | 100 |
| Carrot and Nut Salad | 11 | 61 |
| Eggplant Croquettes | 18 | 110 |
| Green Peas | 24 | 95 |
| Banana Snow | 15 | 91 |
| Cereal Coffee with Evaporated Milk and Sugar | 8 | 65 |
| Per cent of protein for the meal, 18. | 114 | 615 |

For vegetable bouillon, use recipe 37, or the water from any cooked vegetable. Prepare croquettes and banana snow according to recipes 52 and 98. To make each individual salad, grate an average carrot and add to it two or three nuts chopped. Serve on a lettuce leaf with lemon dressing.

---

It can be seen readily from the above menus that the per cent of protein can be very easily varied. In this way the protein balance may be adjusted according to the needs of the individual and to circumstances. With a breakfast and dinner both high in protein, the third meal need contain little, if any, as when only fruit is taken. Even with the low total of 600 calories, as in No. 9, it is possible to so adjust the protein balance that the person who needs only a low total may

still get his 100 or more of protein for the meal. The servings, of course, may be increased, and the value easily calculated.

Meats are so commonly used in the making of sandwiches, and sandwiches are often so pleasing and practical a means of serving food for lunches, picnics, etc., that this chapter would hardly seem complete without a few suggestions as to satisfactory meatless sandwich filling.

There is no reason why the dark breads as well as white should not be used for sandwiches. The slices should be cut thin and the hard upper crust may be removed, care being taken that it is not wasted, but saved to make zwieback strips, croutons, or zwieback crumbs. The bread may or may not be buttered, depending upon the nature of the filling. As a general thing, fillings that supply protein are rather better than those that furnish a preponderance of sweet, unless the protein has been well supplied in some other way. Usually an occasion for sandwiches means plenty of sweets in some other form, as cake, ice cream, etc.

Egg, cottage cheese, and peanut butter sandwiches are always good, and may be a help in supplying the protein part of the child's school lunch. Among other satisfactory fillings are the following:

1. Nut Tomato Sandwich

   Emulsify peanut butter with strained tomato, salt slightly. Use the same as plain peanut butter.

2. Cottage Cheese Tomato Sandwich

   Add to cottage cheese enough strained tomato to make it the proper consistency. Mix well. Use with a lettuce leaf for sandwich filling.

3. Carrot Cottage Cheese Sandwich
   Make filling according to recipe 77.
4. Bean Sandwich
   Press beans through a colander, add salt and a little lemon juice. Use for sandwich filling.
5. Lentil Sandwich
   Prepare as No. 4.
6. Green Pea Sandwich
   To pea purée add a little evaporated milk, salt, and use as filling.
7. Protose Sandwich
   Remove protose from can, mash, add lemon juice and salt, mix well, and use.
8. Protose and Nuttolene Sandwich
   Prepare as in No. 7, using equal parts of protose and nuttolene.
9. Lettuce Sandwich
   Spread buttered bread with mayonnaise, and use lettuce leaf for filling.
10. Celery Sandwich
    Steam bread, then butter, roll around a celery stalk, and tie the roll with baby ribbon. Serve as soon as possible.
11. Tomato Sandwich
    Spread buttered bread with mayonnaise, and use large slice of tomato for filling.
12. Salad Sandwich
    Chop lettuce, tomato, radishes, celery, carrots, or any other raw vegetable, all together, mix with mayonnaise, and use for filling.

# CHAPTER XX

## COMBINATIONS

### The Solution

THE question of proper and hygienic combinations of food is one which greatly exercises the mind of many who find it necessary to consider their diet from a health viewpoint. Yet we believe that those who have carefully followed us in our discussion of the previous chapters can readily see that when the daily ration is properly balanced, and one is careful not to overeat, the problem of food combination is to a great extent solved. And again we are reminded of the beauty and freedom of eating, as well as living, by principle rather than merely by rule. However, there are a few points in this connection which perhaps should be spoken of in addition to those already discussed.

### Small Variety

First, and perhaps most important of all, is this: the menu having been properly balanced, it is much better to serve a small variety at one meal. A large variety often complicates the digestive processes and tends to overeating. Different kinds of digestive juices are called forth by different foods. If the variety is too great, the stomach may find it difficult or impossible to manufacture so many kinds of gastric juice at the same time, and thus the digestive process be hindered.

Often when some particular food disagrees, it can be eaten and properly digested if taken unmixed with other foods. This is sometimes true in cases where fruit is not well taken. Although fruit should form a part of the dietary of every one, yet there are those

who seem unable to take it in any form, particularly if raw, or very acid. In nearly every case if these persons would devote one meal to the eating of fruit and nothing else, they would find themselves able to eat it without trouble, and they would often soon find it possible to add one other simple food to the fruit meal, such as oven toast or cereal in some form.

### Fruit and Vegetables

The combination of fruit and vegetable is not an ideal one. Fruit, being a predigested food, should pass from the stomach very soon after entering it. Vegetables often require rather a prolonged stomach digestion because of the protein which they contain. The cellulose of either fruit or vegetable is usually all the cellulose the stomach should be called upon to handle at one time, unless, of course, either is in very small amounts. The fruit cellulose in addition to that contained in the vegetable may greatly retard and even prevent the digestion of the vegetable protein. This objection is to a great extent removed if the fruit is served in the form of a purée, the cellulose removed as in prune or apple whip, fruit mold, etc., or if the vegetables are tender, free from fibrous cellulose, and easy of digestion. There is ordinarily no objection to fruit juices taken at meals where vegetables are served.

### Starch and Acids

Much has been said in regard to the combination of starches and acids, the reason being given that the ptyalin of the saliva, which acts upon starch, does its work only in an alkaline medium, the saliva normally being slightly alkaline. However, as all our food, except meat and nuts, contains starch, this would interdict the eating of fruits with any food ordinarily served. Even cottage cheese and buttermilk, with their

lactic acid content, would have to be eaten by themselves.

Starch digestion is carried on to a great extent, in the small intestine, and if the process of mastication is thorough enough to finely divide the food, there need be little concern as to the chemical digestion of starch. As a matter of fact, fruit acids in the mouth stimulate the secretion of a very strongly alkaline saliva.

### Milk and Sugar

The milk and sugar combination has already been spoken of, and while it is perhaps not necessary to avoid it entirely, it should be remembered that milk and sugar combined in excessive quantities may prove very injurious, and for one with a weak digestion should be avoided.

### Fruit and Milk

Whether or not milk and fruit should be taken at the same meal, depends largely on *how* they are taken. We quote as follows:

" There is a deep-rooted impression that sweet milk and fruit should not be taken at the same meal. This idea is evidently largely based upon the fact that milk curdles in the presence of a fruit acid; but the curdling of the milk by the fruit acid aids rather than retards its digestion. The first thing that happens to milk when it reaches the stomach is that it is curdled. There is a special milk-curdling ferment in the stomach. A fruit juice more acid than the normal gastric juice of the stomach cannot be found. Lemon juice, one of the most acid of fruit juices, added to milk, renders the milk easier of digestion. We should guard against the sudden pouring of a large quantity of milk into the stomach, as this may form large, tough curds, difficult of digestion. If the milk is taken slowly, or

mixed with the food as it enters the stomach, it will be converted into small curds."— *George Thomason, M. D.*

Experiments seem to show that it is the mixing with the food rather than the sipping that prevents large curds.

### Medicinal Value of Fruit

It is well to remember that fruit is practically predigested, and quickly passes from the stomach, unless combined with a food requiring prolonged stomach digestion. For this reason some may find it an advantage to eat the fruit part of their meal first, thus allowing it time to pass from the stomach before a great deal in the way of other food follows. Still others, as suggested above, find it better to eat their fruit alone, uncombined with other foods. The full medicinal value of fruit is best obtained by taking it on an empty stomach. Ordinarily, however, milk eaten on cereal or mixed with other food need interfere in no way with the taking of fruit with the same meal. Boiled milk does not form large curds, so is more quickly digested than raw milk and less liable to hinder the digestion of any other food with which it may be combined.[1] It should be remembered

---

[1] "Brennemann emphasizes the following facts: 'Cow's milk is not a liquid food, but a solid food — so solid, in fact, that in babies the curds found in the stomach often pass through the intestinal tract and appear in the stools as tough, hard, beanlike curds.'

"The summary of his experiments shows that raw milk skimmed, forms hard, rubbery masses, not easily broken. That with whole milk the masses are tough and leathery, but not to the same extent as skimmed milk. The use of top milk made the curds somewhat softer, but delayed digestion considerably. The use of boiled milk resulted in the curds being fine and more flocculent, no tendency to form masses, as does raw milk. The length of time for complete emptying of the stomach was somewhat shorter in the case of boiled milk. Another very interesting point he noted was, that smaller curds of raw milk had a tendency to coalesce and form large masses. This feature was made use of in one experiment in which he had the subject sip one quart of raw milk over a period of forty-five minutes, and thirty minutes later he tried to return the milk, but was able to get only the whey. Five hours later he was unable to get anything more until he had used two glasses of water, then only a few small curds. But during that time the subject complained of a "heavy feeling" in the pit of the stomach. The experiment was performed several times, with the same results, then was done in an open dish, using Chymogen (a rennet preparation), gently stirring all the time, and over a period of more than an hour. The results were a complete coagulation into two large masses which could not be broken up. His conclusions were that this same process occurred in the stomach and that the idea of taking milk in small sips to prevent the formation of large curds in the stomach was fallacious, because the curds had some sort of affinity for each other and would form larger masses." — Reprinted from an article by Dr. A. J. Scott, Jr., in the Southern California Practitioner, February, 1920.

that *thorough mastication will prevent the unpleasant results which sometimes seem to follow the introduction of unlike foods into the stomach.* More often incomplete mastication, rather than the nonideal combination, leads to fermentation.

## Two Starches

Another rule in regard to combinations that has been given is the one that two starches should not be eaten at the same meal, or that bread must not be eaten with a starchy food. However, as so many of our foods contain starch, the following of this rule would be quite impractical. The principle underlying it obviously involves the question of the proper food balance. This having been looked after by the intelligent housewife in the planning of the meal, the question of whether or not two or more foods containing starch should be combined can be forgotten. It can readily be seen that a meal composed of rice and potatoes, with white bread, would be far from correct healthwise, but this mistake no one who understands the fundamentals of dietetics will make.

## Two Kinds of Fruit

Some one else raises the question, "Should two kinds of fruit be eaten at one meal, or is it healthful to eat stewed fruit and fresh fruit at the same time?" We know of no reason why these combinations are objectionable, and again we would emphasize the importance of getting away from petty rules and of intelligently planning the daily dietary, combining common sense and good judgment with a knowledge of scientific principles. Eat a few well-selected foods at one meal. Do not overeat or undereat, but see that the foods are so prepared and combined in the daily ration that the necessary food elements in proper proportion and amount are supplied to the body.

## Drinking at Meals

Drinking at meals may well be mentioned here. The contents of the stomach are liquid; food, when properly masticated, approaches a liquid state. The more nearly homogeneous, or thoroughly mixed, this food mass is, the greater the ease of digestion. The semiliquid food mass must be gripped by the muscular wall of the stomach and thoroughly permeated by and mixed with the gastric juice, and as an evenly divided homogeneous liquid, enter the intestine. Liquid sipped, or taken in spoonfuls, and mixed with other food as it is taken, may facilitate this result, but if taken in quantities unmixed with food, it may overdistend the stomach and enfeeble its muscular grip. If, at the same time, chunks of incompletely masticated food are swallowed, the stomach may have to deal with a veritable pond in which more or less solid masses of food are floating, making the proposition of resolving it all into a well-mixed mass, a very difficult one. Housewives well know that in mixing water with semisolid food material it is much easier when the water is added gradually, and just so it is in the stomach. If at the same time the gastric juice is greatly diluted by an excess of fluid, the chemical phase of digestion may be hindered.

When a large amount of concentrated food is being ingested, some water taken with the meal may be an advantage, and occasionally, as after exercise, when thirst demands a drink of water at mealtime, the presence of a systemic need for water may cause the excess of fluid to be very quickly absorbed. Fluid taken at meals should never interfere with thorough mastication. With these principles in mind, the question of water drinking at meals must be decided by the individual, as indeed should all dietetic rules. The principle, not the rule, must ever be the guide.

# CHAPTER XXI

## THE FEEDING OF CHILDREN

It is in childhood that the foundation for the health or ills of life is laid, and more can be accomplished by proper feeding of the boys and girls while yet in the developmental stage than in after-years when the seeds of ill health have long been sown and nature has begun to take her toll. Careful feeding can do much to prevent the digestive upsets and respiratory troubles so common among children, and will lay a foundation for health and strength in after-life that means more than any heritage of lands or gold.

### Normal Physical Growth

We cannot in our limited space present an exhaustive treatise on this important phase of dietetics, but we can lay down a few principles that may serve as a helpful guide in the important work of supplying to the child the food which will yield happy results in the way of a normal physical growth. The body is made up of the food supplied to it. This food should be complete, untainted by impurities introduced from without or manufactured from within.

### Regularity

Perhaps one of the most important things to be made emphatic is the necessity for regularity in feeding, with ample length of time between meals for the stomach to entirely empty itself. We find that even infants do much better when fed every three or four hours, than when fed every two hours, as has so commonly been done. They gain in weight more rapidly, have less colic, and are happier in every way.

### A Precaution

When it is necessary to feed babies artificially, it is safer to use only sterilized milk. It has been found, too, that the boiling of milk greatly increases its digestibility.[1] However, if the milk is boiled or even Pasteurized, it is of the greatest importance that these babies receive in addition to their milk, at least an ounce of orange juice daily; a neglect of this precaution often being a factor in nutritional disturbances, such as scurvy, eczema, rickets, etc. (See Chapter IX.) Orange juice may be introduced carefully into their diet at any time after the age of one month, and it is often a valuable addition to the diet of even a nursing infant.

If the baby does not take orange juice well or if this fruit is difficult to obtain, the necessary vitamines may be supplied in potato water or in other vegetable broths. Other fruit juices may be used, as lemon juice or grapefruit juice, or the juice of canned tomatoes may be given.

### After Seven Months

It is well, after the age of seven months, gradually to introduce into the diet additional foods, as vegetable broths and purées, potato gruel, and cereal gruels. To make the cereal gruels, the cereals should, after thorough cooking, be put through a colander or strainer, and to the jelly-like mass left should be added milk (not cream) to make it the consistency of gruel. Add no sugar.

### The Second Year — Importance of Vegetables

A little later, or by the age of nine months, vegetable purées, oven toast, hard crackers, and scraped apple or apple sauce should be given; also other fruit purées and fruit juices. Early in the second year the child should

---

[1] According to Dennett, the milk or milk mixture, the proportion depending upon the baby's age, should be boiled vigorously for three minutes, stirring well to prevent the formation of a scum. The curds formed from this milk are fine and much like those of mother's milk, and when properly supplemented with orange juice and vegetable broths, are not constipating.

begin to have green vegetables, as spinach, green peas, string beans, etc. These should be puréed at first, but soon the child may be taught to masticate thoroughly the more tender cellulose, so that tender, carefully cooked vegetables may be given without being strained or puréed. This early training to like vegetables is of great importance.

Milk is ever a very important food for children, and throughout childhood a quart of milk daily may well form the basis of the diet. Milk may be considered a safeguard against conditions arising from a defici diet. However, as important as it is, it should not be allowed to crowd out other important foods, especially the leafy vegetables. One mistake that is often made is in keeping children too long on milk alone, some babies being nursed into the second year or kept upon the bottle long after they should be having a greater variety of food.

### Cereals Without Sugar

The cereals will during the second year have an important place in the diet of the child, along with milk toast and stale bread and milk. In the beginning of the second year, well-cooked cereals may be given the child without the preparatory process of straining. These cereals should be *thoroughly* cooked. The mistake is often made of adding sugar to the cereal, but the child should learn from the first to take cereal and milk without sugar. Great harm is done by educating children to like sugar in this way. Never at any time should the combination of milk and sugar be allowed on cereal, whether gruel or mush.

Bread should be whole wheat and Graham, or made from other whole grains, and should be at least thirty-six hours old. All toast given the child, whether dry or as milk toast, should be in the form of oven toast,

hard clear through. Ordinarily, after six months the daily feedings should be four, at four-hour intervals, and the sooner after the age of twelve months that a child is put on three meals a day the better, with orange juice and perhaps other fresh fruit, as, for example, a scraped apple, between meals.

### Sweets

Artificial sweets should be limited. (See Chapter VIII, p. 66, quotation from Dr. Kerley.) It were better for any child if he need never know of the existence of cake, pie, ice cream, and ordinary desserts. It is only as a result of education that children acquire the sweet tooth so common among them. But it can hardly be hoped that the ideal will be reached — there are too many loving friends to teach our children to like these things for us to expect to be able to keep sweets entirely away from them. If the sweets could be limited to their proper place and to that alone, no harm perhaps might be done, but with the knowledge of the delight to the palate comes the difficulty of teaching proper control and moderation. However, this must be done, and our aim as parents must be, if not to restrict entirely, to limit candy and other sweets to the proper time, place, and amount. Much can be done in this direction, and it is surprising how much co-operation can be elicited from the little folks if they are taught in the interesting way that it is possible for them to be taught, the importance of caring for the body machine as carefully as father looks after his watch or his automobile.

### Self-Control

The element of education and discipline entering into this phase of child culture gives the parents the great opportunity of obtaining results not only in a physical way, but also in the way of character building and self-

control, so closely is the physical allied to the intellectual and moral.

But it is only as the mother has mastered for herself the problem of eating for health and the necessary self-control to reach this high ideal, that she can be master of the important work of feeding and teaching her child.

### Generosity

The dainty morsel of candy can be eaten as dessert, and when the little one has, with a hearty appetite, eaten well of the dinner served, a very small amount of candy will suffice. Then too, as a matter of politeness, the supply of sweets must be passed and divided with the members of the family, and in this way the amount may be quite easily limited to the one or two pieces the child may be allowed to have. With great care should the mother prepare the simple dessert allowed her tiny man, that there may be nothing served him that would in any way detract from the benefit his little body should derive from this food.

### Simple Desserts

Cereal desserts made with cereal, egg, and a moderate amount of sugar are often good (see recipes, Chapter XXXI), and, served at the midday meal, simply add more calories that the growing child may thrive. Desserts such as prune whip, banana whip, junket, fruit mold (see recipes, Chapter XXXI), are all good and supply the necessary sweet. The little one will delight in these simple things if they are made attractive, and he will derive only benefit from them. Dried fruits, as figs, dates, raisins, etc., may help to supply the needed sweet in a very wholesome form.

### Fresh Fruits

The child should have fresh fruit daily, which will be delighted in for its own flavor, if a little tact is

used by the thoughtful mother. The sliced peaches, berries, and other fresh fruit served may be enjoyed without the sugar usually added. Special care should be taken that this fruit be naturally sweet and palatable. The children will enjoy honey, instead of sugar, on their grapefruit and it will be better for them. (See page 212.) The older members of the family may in their interest in watching the beautiful development of this normal boy or girl, become enthusiastic in eating as carefully as the little folks are taught to eat, and thus become examples, incidentally deriving immense advantage to themselves.

### Ice Cream

A taste for ice cream should not be cultivated early. As the child grows older it may seem almost impossible to withhold it entirely, but it must be insisted upon that it be eaten only at mealtime, that it take the place of real food, and that it be eaten slowly and in moderation. Too much cannot be said against the pernicious custom of permitting the child to obtain ice-cream sodas and ice-cream cones promiscuously from any and every ice-cream stand. This tempting sweet should be obtained from a source that guarantees its freshness and purity, and served with care, preferably at the regular meal.

### Cake

A simple sponge cake or plain cooky may be allowed in place of, or in connection with, the dessert.

At bread-making time a crusty, sweet cake can be made from the bread dough that will be as much a delight to the normally educated child as a French pastry to the one who has been trained to like excessive and rich sweets. When pie is served the older members, how the little one will rejoice in a tiny pie made espe-

cially for his or her benefit, and the crust may be as hygienic as bread, for it may be made from the same dough, and its palatability will never be questioned by the small recipient.

### Concentrated Food

Another common mistake in feeding children is in the thought that they must have an abundance of fat — cream on their cereal, butter freely on bread, richly seasoned vegetables, and even fried and greasy foods. This plan for them does untold harm, and their appetites are so educated that they can never, perhaps, get away from the bondage of acquired and perverted tastes. Dr. Kerley says that "the average child after the sixth year receives two or three times as much energy food as he requires." (This statement probably does not include the poorer classes.) Energy food we know to be fat and carbohydrate.

### Undesirable Results

In almost every case whole milk is better than cream. The child needs ample protein, but not an excess of fat. The catarrhal conditions, frequent colds, enlarged tonsils, adenoids, and recurrent bronchitis so common among children undoubtedly are favored, if not caused, by the excess of fat given them, together with the large amount of sweets allowed in their diet. The result of these mistakes is never entirely overcome, and thus the individual goes through life handicapped because of the ignorance of his parents.

### A Corrective Diet

For a child subject to colds, no plan is better than a diet limited, for a time at least, to boiled skim milk, whole cereals, green vegetables, fruits, cottage cheese, buttermilk, vegetable broths, and vegetable soups (see

recipes 23 to 31, Chapter XXXI), with perhaps an occasional egg. Butter used very moderately if at all.

Above all things, do not serve your children hot fresh bread, griddle cakes, fried potatoes, richly seasoned foods of any kind.

### To Encourage Mastication

Give the children plenty of food requiring thorough mastication, as hard-tack, oven toast, etc. Teach them to masticate thoroughly. Impress upon their minds that if they are to have beautiful, sound teeth, these teeth must be exercised as well as kept clean. Tell them how the starch is changed to sugar in the mouth. Let them become interested in seeing how much sugar they can manufacture out of a crust of bread and how sweet the sugar will taste. The social element at mealtime may be one of the best safeguards against too rapid eating and improper mastication.

We quote the following:

" After the teeth begin to come, children should be given all their starchy food in as hard a form as possible and the per cent of starch limited.

" The preponderance of the carbohydrates in the diet is one of the causes of so many children entering the kindergarten with their teeth broken down to the gums and small undersized jaws. One of our responsibilities is spreading the knowledge that no demineralized white bread or crackers should ever be given to a child under five. We not only need all the lime salts contained in the dark breads to build the teeth and bones, but we need exercise to develop the jaws.

" Children who eat tough bran bread made into toast instead of mush, and who do not drink while eating, usually get the proper development of the jaws."— *M. Evangeline Jordan, D. D. S., in California State Health Bulletin.*

### Co-operation

Children must never be allowed to drink tea or coffee; even cocoa should be kept away from them. They are much better off without meat and meat broths with their protein wastes. It is well for the child up to the age of four or five years to eat by himself, and not at the family table, unless the other members of the household can themselves co-operate with the small boy or girl in eating for body strength and health. Usually the evening dinner is later than the child should take his evening meal, and it becomes a simple matter to serve his simple meal at 5:30, and his appetite is entirely satisfied when an hour later his elders partake of theirs.

### Between Meals

Never should food be allowed between meals. If the hungry boy waits until mealtime, he will eat at the right time the food he needs, and care much less about the sweet after-part. Plain food will taste good and be quite satisfactory, and the supply taken will be sufficient to last until the next regular meal. If the boy after school must have something to "stay his stomach" until supper time, let it be an apple or other fruit, and this the regular daily plan, instead of a spasmodic one.

### School Lunches

For school lunches, fresh juicy fruits should always be included if possible. In addition, a ripe banana, dates, raisins, nuts, and olives are valuable. Stuffed dates are easily prepared and are enjoyed quite as well as the less hygienic sweets. These foods, together with whole-wheat or Graham sandwiches made so as to supply protein and vitamines, and, if possible, a thermos bottle of milk or vegetable soup, make the best lunches for growing boys and girls. (See page 170.)

### Amount of Food Needed by Child

During the period of growth and development, much more food is needed per pound of body weight than after maturity is reached. It is impossible to say how much food a growing child may need. It all depends upon the activity of the child and the rapidity with which new tissues are formed. The child who cares little for vigorous play but enjoys his books, should eat less food than the one who plays hard all day. Other things being equal, the child of phlegmatic temperament will need less food than the one who is of a more nervous, impulsive type. The amount of food needed depends upon tissue activity, and this varies with individual temperament. Boys, because of greater muscular activity, need more food than do girls.

Every mother should see that her child gets active physical exercise daily. Then if the boy or girl is fed regularly, does not eat between meals, eats wholesome food, prepared with due regard for hygienic principles as outlined above, the appetite will be one of the best guides as to the amount of food required.

### Lack of Appetite

When the appetite of the child seems to fail, it usually means that he has been eating too much concentrated food, and limiting his diet for a meal, or a day, to fruits and fruit juices, will often prove very beneficial and insure a speedy return to a good appetite. A careful estimate for a few weeks of the calories taken by the child will be of advantage to the mother from an educational standpoint, and will permit her to study and to determine the results when the daily amount in food units is decreased or increased for a time.

Because of the constant formation of new tissue, the protein part of the child's diet may well be kept to at

least the minimum standard for the adult — that of 200 calories. This is by no means to be regarded as an arbitrary standard. The point to be emphasized is that the child needs a relatively higher protein ration than the man. It should be remembered that it is not bulk so much as concentration of food that determines its caloric value. And also that the candy or knickknack taken between meals may increase the total food value above actual body requirement, even though the child eats a comparatively small amount of food at mealtime.

### Body Demands Great

*Do not underfeed your children.* They must be properly and sufficiently nourished. Their body demands are great and must be supplied, but they can have enough food without that which will handicap rather than help the body in its work. Of protein they must have an ample amount, of carbohydrate and fat a normal supply, but they may get this without excess and with every advantage to their growing needs. Great danger lies in a diet for them top-heavy in fats and carbohydrates, with often not enough protein. The results of such an unbalanced diet are serious, and parents should know how to avoid a mistake which is far too common. Some sweets they should have, but the intelligent mother, having mastered the important principles of nutrition, will supply these in a simple, not too concentrated form and combined in a healthful way. She will be teacher as well as mother, and will teach her boys and girls that the most wonderful, the most manly, womanly thing they can do is to develop strong, healthy, normal body machines that will make of them strong, noble men and women, able always to do well their part and to make a success of life.

# CHAPTER XXII

## FADS

WHAT to eat has always been the big and engrossing question with mankind ever since Eve in the garden made her first great mistake, and Adam as the result was sentenced to a lifelong earning of his bread in the sweat of his face. The question has been an absorbing one from the viewpoint of the epicurean whose desire was to find some new thing with which to please the palate, to that of the man or woman who in the face of poverty has had the problem to solve with the wolf at the door.

### What Shall We Eat?

The primary thought in regard to eating having ever been to please the senses, man has long since reached the place where because of certain discomforts and ailments obviously due to error somewhere in the amount or kind of food taken, he asks the question, "What shall I eat?" from the standpoint of one who has come to realize that he must eat to live rather than live to eat.

We hear the question from the man or woman who regards it sanely, sensibly, and with a real desire to understand the principles underlying nutrition; and from the fanatic and the hypochondriac, who look upon all food as an enemy and seem to think that the less of it and in the more unpalatable form the better, expecting that everything eaten will cause distress unless it be taken according to the most rigid rules and with the utmost self-denial.

This question has been carefully investigated from the viewpoint of science, more and greater light has grad-

ually been thrown upon it, until today those interested in this all-important subject have only to study the proper literature to learn much in regard to the scientific principles underlying the question of how to supply the body with proper food.

### Fads Many and Varied

Together with a fund of scientific facts accessible to the investigative mind are various fancies and fads brought forth by those who in their searching have often got but a single truth instead of the whole fundamental outline involving body nutrition. Fads in regard to diet are many and varied. The question of eating having become so problematical, men both scientific and otherwise have advanced many theories as to the practical solution of these dietetic problems.

### Fasting

The partaking of food leading to so many ills, it has been only a matter of course that some one should come forward with the assertion that, if eating causes such a large proportion of sickness, abstinence from food would undoubtedly prove a cure-all, and so the "fasting" fad has had its day.

### Forced Feeding

So much trouble has resulted from faulty and incomplete nutrition, that it has seemed the natural thing that an effort be made to overcome this condition by forcing an excess of food upon the body. The thought has been that at least a part of the excess must be assimilated and that the body, gaining strength from added nourishment, would be better able to cope with problems due to a weak digestive tract. And so "forced feeding" has played a great part in the treatment of anemic conditions, malnutrition, and wasting disease, as tuberculosis, etc.

## Low Protein

Abnormal conditions resulting from errors in protein digestion and metabolism being so apparent, the "low protein" idea has been advanced, and many have been led to the extreme of omitting as nearly as possible all protein from the diet — subsisting on a meatless, eggless, milkless diet, with nothing to take the place of these protein foods.

## Milk Diet

Protein, however, being such a necessity and the harm resulting from a deficient protein diet so apparent, to secure this food in as digestible and assimilable a form as possible has seemed most important, and so the "milk diet" has had and still holds a great place as a "cure-all" for all conditions of disturbed nutrition and chronic disease.

## No Breakfast

Others, seeing conditions so often resulting from an overworked digestive tract and an excessive body fuel supply, have sought to solve the problem and to obtain results by the "no breakfast plan," which has worked admirably in many cases.

## Raw Food

Again, the prevalence of eating processed, overcooked, overseasoned foods having been so evidently a factor in the causation of disease, the advantages of the other extreme have been widely heralded, and the "raw food" fad has had a great following, with much benefit, no doubt, to some.

## Combinations

So much of digestive disturbance seemingly being due to improper combination of various sorts, many have thought that all dietetic errors might be corrected if

a few rules in regard to what foods may be combined, were obeyed, and so, many "diet specialists" have confined their dietetic teaching to the question of "combinations." So we hear that a starch and an acid must not be eaten at the same meal; bread must not be eaten with starchy foods; two starches must not be combined; two kinds of fruits, fruit and vegetables, fruit and milk, are all wrong combinations, until one finds himself so surrounded by a maze of rules that bewilderment results and fear lest some rule be disobeyed takes such a hold that eating becomes a burden and the digestive organs, affected by anxious mental impulse, are unable to care for the simple food that may be taken. These bewildered friends, still suffering ills apparently due to dietetic mistakes, are at loss to know how to solve a problem which becomes more and more a vital one, and in desperation ask the question, "What can we eat?"

### "Eat What You Want"

Along with this comes the theory that it does not make any difference what you eat; "forget it and eat what you want." Build up the general health by exercise, and proper and regular living; maintain the correct mental attitude and eat what your appetite calls for. For those who have long been introspective and have feared to eat, this advice may be very timely.

### Many Winds of Doctrine

We should wish no one to think that we have not the fullest respect for each one of these various rules in regard to eating. Each one has done much good, and in selected cases under proper supervision there is no doubt but that each one of these may apply and perhaps in a more or less modified way be used with great success in the treatment of various and sundry abnor-

mal conditions. Every one of these hobbies has had its basis in truth. It is in the application that mistakes have been made. The rule has been advanced, the reason why has been vague and indefinite, and the people, untaught in regard to body processes and food composition, have been tossed about by many winds of dietetic doctrine.

## A Better Way

The reason for these rules in regard to eating becomes very apparent when one has been properly educated in food fundamentals. The application, based upon principle, then becomes plain and the modern housewife, as the home dietitian, may wisely plan the food program for her family in such a way as to apply sensibly the principles upon which all these fads are founded. She can thus avoid the necessity of having members of her family submit to any one of the above lines of dietetic treatment for the correction of conditions which are brought on by overeating, undereating, or improper eating of any sort.

Briefly, we will consider the principles underlying the application of the eight methods given above of overcoming nutritional ills.

## An Antitoxic Diet

1. *Fasting.*— In conditions of auto-intoxication and overloaded digestive tract, excessive putrefaction in the large intestine and a body often supersaturated with nourishment, a fast for a more or less limited time undoubtedly would be indicated. It must be remembered, however, that except perhaps for a short time, the advantage of a complete fast, without the disadvantage, may be obtained by a modified fast, such as a food supply limited to those things that will tend to decrease auto-intoxication, e. g., fruits and fruit juices.

These may be taken alone or with vegetable broth or green vegetables, and perhaps lactic acid foods, as cottage cheese, buttermilk, and yogurt.[1] An occasional meal missed, or a day without food or with nothing but fruit, will often be found a great advantage. " Abstemiousness in diet is rewarded by mental and moral vigor." — *White.*

*2. Forced Feeding.*— Less can be said in favor of this plan. However, there are cases where the food supply has long been deficient when it may be found a decided advantage to insist upon the ingestion of food in amounts necessary to supply the excess of nourishment needed to build up a body long weakened and wasted from lack of food. This is to be done gradually and carefully, with due regard for existing conditions and dietetic principles. This plan should always be carried out under competent supervision.

### Serious Results

*3. Low Protein.*— Those who have long overeaten of protein food and are suffering the results of protein putrefaction in the intestine and incomplete protein metabolism, often do well for a time on much less than a normal supply of this nitrogenous food, until the excess has been eliminated and the body calls for more to keep up actual repair. However, this must be done carefully, as an exceedingly low protein diet continued for too long a time will result in weakness, lowered nerve tone, malnutrition, and even, because of lowered resistance, in an increased susceptibility to such diseases as tuberculosis. In these cases the ingestion of protein is less than the outgo; the body is out of nitrogenous equilib-

---

[1] In the dietetic treatment of diabetes, an initial period of fasting is often carried on under the careful supervision of the attending physician. (See page 249.)

rium (see footnote, page 38), and the results will be serious unless the condition is soon corrected.

**In Selected Cases**

*4. The Milk Diet.*— This diet is valuable in many cases. It permits of an excess of nourishment in an easily digested and assimilated form. Many will take the amount of food units that their body needs and the excess that, because of depleted conditions, they should have for a time, in the form of milk better than in any other way. However, we believe that these cases should be carefully selected and that often the same, or even better, results may be obtained by a modified milk diet, or by a diet in which the same advantages may be derived without the absolute restriction. We know of no serious objection to the milk diet as a trial, even though the same results might be obtained in another way. The plan is simple and needs not the thorough knowledge of foods necessary in planning a varied diet with the same results in view.

Often little permanent good results from this plan of feeding, because the patient, upon going back to his usual dietetic program, returns to the same errors that led to trouble in the first place; so he has gained little in the way of lasting benefit if in addition to the milk diet he has not obtained a knowledge of the normal rational eating that makes for health.

*5. The No-Breakfast Plan.*— This plan we consider a very good one because, first, many have eaten a hearty dinner the evening before, their digestive organs have had to work while they slept and are in no condition in the early morning to take up the work of digesting even a light breakfast; secondly, the plan lessens the daily food intake and discourages overeating; thirdly, the digestive organs should have more rest between

meals than they usually get, six to eight hours intervening being the ideal. With no breakfast and an early lunch this would be accomplished.

It can readily be seen, however, that understanding the principle, one may get the same advantageous results by leaving out supper or by eating carefully three times a day.

6. *Raw Food Diet.*— The advantages of this are many:

*a.* It insures an ample supply of vitamines, which lessens the amount of protein needed. (See Chapter IX.)

*b.* It necessitates thorough mastication.

*c.* It prevents rapid eating.

*d.* It hinders excessive seasoning and the use of superheated fats.

*e.* Many vegetables are more digestible raw than cooked.

These principles borne in mind will enable one to avail himself of all the advantages of the raw food diet without the restrictions. However, too much cannot be said in favor of the eating of vegetables and fruits raw, a certain amount of these taken daily being a decided advantage.

7. *Combinations.*— This is by no means an unimportant subject, and the housewife wishing to feed her family for the best results in health and vigor, should be informed as to the principles underlying this phase of dietetics. But here, as elsewhere, those who have only a few rules by which to be guided, without a knowledge of the reasons why, will often fail to accomplish the important results they seek. (See Chapter XX.)

8. *"Eat What You Want."* — For the poor neurasthenic, who has forgotten everything in life but the question of what he dare put into his stomach, this is

perhaps the best of all. And it explains the often apparently marvelous results of various faith cures, so called. Too much attention to the digestive tract may be worse than none at all, and some may well, for a time at least, "forget it."

### Principles, Not Rules

Again the importance of intelligent application of principle cannot be too emphatically urged. Let us know our bodies and their needs; supply them wisely and in a masterly way, and thus rise above the petty handicaps that hinder us in our endeavor to reach our ideals and to find success.

"*There are more things in heaven and earth, Horatio, than are dreamt of in your philosophy.*"—*Shakespeare.*

# CHAPTER XXIII

## FOOD ECONOMY

INTELLIGENT economy in food means conservation, not only of food but also of health. This was well illustrated in the food conservation campaign during the Great War. Up to that time the American people, as a whole, had known little real need for economy in any direction, and the resulting profligacy in foods went hand in hand with extravagant expenditures of body resources as regarded health.

The season of stress through which we so recently passed, demanding the greatest effort in the direction of food economy, could only result in a betterment of the general health of the people, for it placed a very definite check on overeating, which, of all wastes, should be studiously avoided, because it wastes not only food but health. Better to let perfectly good food rot in the garbage can than in the digestive tract, much as the former is to be deplored.

In the light of scientific education the knowledge imparted to the people at that time was of inestimable value. Many a mother was blessed with a new vision. The needs of the hour gradually lent a new interest to her plans. Her work was no longer a mere drudgery, with its only purpose to please the varied tastes of a family demanding that their appetites be pampered three times a day, but she became master of a new situation, that of furnishing the table with foods adequate for body needs, yet balanced with such correctness that there was the least possible waste in the raw material, in its preparation, or in its ultimate utilization by the body. This, while meeting the situation of the hour,

she learned, promised the highest and most satisfactory results in the health and strength of those eating at her table. She found herself no longer merely a cook, but a dietitian as well, whether she prepared the food with her own hands or directed its preparation. Thus, while she served her country, she became an added blessing to her family and to the race.

The need no longer so urgent, many a housewife, having learned the way of true economy, still continues to guide the eating habits of her family in the direction that will lead to the results most needed by the home and nation in time of peace as well as in time of war. But there are others, and more, who are too prone to forget the lessons of that time and to drift back into habits of eating that because of the very abundance of the food supply, can only tend to lower the standard of health.

True food economy in so far as the body is concerned, is the partaking of the minimum amount of food necessary to fully supply the body needs and to keep one in health with some reserve in the form of food stored as fat. Overeating, as we have learned, clogs the digestive tract, interferes with proper oxidation and with complete elimination. On this point we can do no better than to give the following, taken from "Dietotherapy," Fitch, Volume II, page 135:

"Overeating causes congestion of the liver and a condition known as 'biliousness,' in which the stomach and intestines are engorged. Constipation ensues, the tongue becomes heavily coated, the bodily secretions are altered in composition, and the urine especially becomes overloaded with salts. It is evident that we are not nourished by the food we eat, but by the amount we can properly use and assimilate. Probably an excess beyond this amount is beneficial, because it supplies a

reserve upon which the body can depend for nourishment in time of need. However, it is absolutely patent that chronic overeating so clogs the machinery of the body that the organs of elimination and excretion are unable to work as they should, intestinal stasis follows, the surplus food material putrefies before it is absorbed in the intestine, the urinary tract becomes infected, the circulation becomes involved in the toxic invasion, and the whole system is poisoned.

"This condition of *intestinal toxemia* brings in its train many mental and physical disabilities. The nervous and muscular systems become saturated with the end products of protein digestion, producing a state of lassitude, headache, fatigue, drowsiness, and even mental stupor.

"The effect of chronic overeating on the mental powers is very evident. Indeed, it may be laid down as an axiom that a person who habitually overeats is incapable of good or sustained mental work. . . . The brain worker or business man, who eats largely, especially in the middle of the day, cannot use his mental powers properly. His mind loses its acuity; and as for flights of imagination, if he is a literary man, they are impossible. Overeating is an insurmountable obstacle in the way of mental endeavor. The handicap placed upon the entire system as the result of overeating is too great to be overcome, and the mind refuses to respond to the stimulus of thought."

And again, from an editorial in the *Medical Record*, June 16, 1917: "Economy in food does not signify ill health, but rather the reverse, as undoubtedly in time of peace and prosperity a very large number of people eat unsuitable food and more than is good for them."

The big food problem of the war was that of having enough food to go around. The solution to this lay

largely in every one's eating only enough to adequately supply his physical needs, but this necessitated the education of the people and obtained for them information as to food values and body nutrition that they had always needed but had never received. Dr. H. Edwin Lewis said in *American Medicine* of May, 1917: "Not the least of the duties of this department [Department of Food Conservation] will be the systematic dissemination of information in regard to the amounts and kinds of foods required to maintain perfect health."

But not only was a reduction in the total amount found necessary, but certain kinds of foods needed to be used more sparingly and with greater care, and we saw the civilized world thrust back, as it were, by the irresistible force of circumstances, to the normal food balance, proportionate with natural supply. Invariably, the foods, in the use of which there had to be a reduction, were those foods that we had been using in excess of physical need and that we could not have had, had not the total food supply been so abundant. And we found that many things ordinarily considered only waste, contained valuable food elements which were in many cases sorely needed to balance up a one-sided food intake. So the outcome of this most valuable educational campaign, in so far as suggestions were carried out, could only mean a normal readjustment of food supply with a proper balance as to food intake. The suggestions of the Department of Food Conservation read like an outline in hygienic dietetics, and we could perhaps find no better summary for healthful eating than is found in the following:

*First, eat less meat.* We came face to face with the fact of our extravagance in feeding so much of our food grains to stock and then killing and eating the animals which might have been saved for the production of

milk, by far the most economic method of converting vegetable to animal food. We were reminded that every pound of meat not eaten would save ten pounds of grain, and the economic value of a vegetarian diet became very apparent. (See Chapter XV.)

*Second, eat less fat.* In "Ten Lessons of Food Conservation," by the United States Food Administration, we were advised to "avoid cooking by means of frying," and again, to "preach the gospel of reducing the total amount of fats one third of an ounce per day for each adult." We were told that the waste of one fourth of an ounce of butter daily in every one of our twenty million households would mean 312,500 pounds a day, 114,062,500 pounds a year. Among other suggestions there were these: "Choose recipes calling for less fats;" "use cream desserts sparingly;" "buy whole milk instead of cream; use the top milk on cereals, etc., and the remainder for drinking and cooking." (See Chapter VII.)

*Third, reduce our sugar supply.* It was suggested that more honey be used; that fresh fruits be eaten more plentifully instead of the cooked foods requiring sugar; that dried fruits be used to take the place of sugar; that dried fruits be added to desserts, in this way lessening the amount of sugar needed. (See Chapter VIII.)

*Fourth, do without white flour.* We found it necessary to use flours made from a variety of cereals, as oatmeal, cornmeal, buckwheat, and rice. Those most addicted to the use of fine flour bread learned, because of war-time necessity, to cultivate a taste for breads made from the coarse, unrefined, whole grains. (See Chapter XIII.)

*Fifth, use more vegetables in season and prepare them without waste.* We were shown that much that

was valuable in the way of nutritional elements has been thrown away. These parts the people were urged to use. (See Chapter XII.)

*Sixth, conserve fuel.* We were urged to use more food in its raw state, and whenever possible to use the fireless cooker. (See Chapter IX.)

While the seventh and last has perhaps more to do with the character than health, we cannot complete our chapter without it.

*Seventh, waste not, want not.* Our attention was called to the enormous waste in this country. A government bulletin told us that the estimated food waste of the United States equaled in value $700,000,000 annually. Dr. H. Edwin Lewis, in *American Medicine* of May, 1917, said: "It is a well-established fact that the waste of food each year is enormous. The amazing prosperity throughout the country during the past few years has made the people careless, and in the kitchens of our homes, our large hotels, and public institutions especially, the waste, according to very conservative estimates has been said to exceed 10 per cent. Indeed, there are those who, as a result of careful thought and investigation, do not hesitate to say that 20 per cent is nearer correct. . . . There is the waste due to thoughtless extravagance in supplying our tables, a common fault of which the majority of the American people are guilty. Thus, at every meal in the home or public eating place the average individual invariably insists on having a great deal more than he needs — often more than he can possibly eat. The remainder is usually thrown away."

From the *Independent* at that time the following was taken: "What is needed is the individual cultivation of the custom of taking no more food on the plate than one expects to eat and then eating it all, unless it proves unpalatable or excessive. If this practice were univer-

sal, we should have enough to put up a palatial post office in every hamlet, pension the descendants of all the soldiers, build the biggest navy in the world, and carry out many of the schemes of social improvement urged upon us."

The lessons learned at that time were productive of much good. Many are still profiting by them, but with others there is the tendency to drift back to the old careless habits. Perhaps the high cost of living is not without its advantages, in that it enforces economy as regards those foods, the extravagant use of which can only be detrimental to health.

Even in times of prosperity the world's needs are great enough to demand conservation of resources in every way possible. "The gospel of the clean plate," so impressed upon our minds in times of stress, should never be forgotten in times of prosperity, and the admonition to "gather up the fragments that remain, that nothing be lost," should be the rule of daily living, no matter how abundant our supply. From every viewpoint the problem of feeding the family with the least expense, the least food waste, and the best results in a sufficient and properly balanced food supply, may become one of fascinating interest. It may make of the housewife a scientist as well as an artist. It may help to raise home-keeping to the dignity of a profession, and in the time of greatest prosperity do more for the nation in the conservation of resources and of race betterment than can in any other way be accomplished.

> *"Much food is in the tillage of the poor: but there is that is destroyed for want of judgment."— Bible.*

# CHAPTER XXIV

## A VEGETARIAN DIET WITHOUT DAIRY PRODUCTS

### Lacto-Vegetarianism

VEGETARIANISM, as generally applied, means a diet free from flesh food. However, strictly speaking, it refers to a diet derived entirely from vegetable sources, all animal food, such as milk, eggs, and butter being excluded. A fleshless diet, including milk, has been more exactly termed lacto-vegetarianism, and this, McCollum says, has been found to be "the most highly satisfactory diet ever adopted in the nutrition of man," and is what is usually meant by the term "vegetarianism." Careful investigation shows that it is possible also to derive all necessary food elements and a properly balanced ration from a strictly vegetarian diet. But, to accomplish this requires so detailed a knowledge of foods and their values, with such a degree of wisdom in their combination, that the general adoption of such a diet would be fraught with much danger to the people. As long as milk is included in the diet, a sufficient and balanced ration is easily possible. It is in the elimination of milk that the difficulty lies.

### Educate the People

Great strides would need to be taken in the education of the people before such a dietetic régime could safely be advised. And yet, as has been demonstrated in the late war, there are times in the experience of man when a knowledge that would make it possible for him to adapt himself to such a diet, would be of infinite value

as a means of life saving in times of emergency.[1] At any rate, the time is ripe for people everywhere to be thoroughly educated as to the ways and means of preserving proper nourishment under all circumstances and conditions, that they may be resourceful in times of unusual food conditions, whether individual or national.

There are individuals who, while needing the complete protein nourishment furnished by milk and eggs, are not able properly to digest and utilize them. There are conditions of ill health which could be markedly improved were it possible for the patient to be properly nourished without the use of animal protein, with its tendency to intestinal putrefaction and toxemia. For these a balanced ration, complete in every way, easy of digestion and assimilation, entirely of vegetable origin, would be of great value.

For the sake of these, and from the standpoint of its general educational value, we will endeavor to show how

---

[1] **Milk.**— The question of milk is a very obtrusive one in war time. It has become almost an article of faith that a large supply of milk is indispensable to the maintenance of good health, and that, if a milk supply failed wholly or in part, the consequences would be disastrous. In time of war, foodstuffs and feeding materials must be economized. To find feeding material sufficient to maintain cows in such a condition that they will provide a good supply of milk, implies a great deal of labor and also the importation of an amount of feeding material which is inconvenient when not impossible under war conditions. It is assuredly true that to conserve infant life, a certain supply of cow's milk is necessary, that is, in the existing state of affairs, when so many women do not suckle their offspring. But that, after the baby age is passed, milk is an absolutely essential article of diet, is strongly combated by many authorities. Campbell went so far as to declare that the child, as distinguished from the babe, does not need milk and would not suffer greatly if the supply of dairy milk suddenly failed. He argued, in the first place, that milk, affording as it does a peculiarly favorable soil for the growth of disease germs, has carried disease and death to hecatombs of children. It has further acted injuriously by favoring the consumption of soft, pappy foods. It is obvious that the infant, like the young of other mammals, requires milk for the first period of its life, and that the proper milk for it is that of its own mother. When this source of supply fails or is not available, as so frequently occurs in these days, resort must be had to the milk of other animals, cows or goats. This has not proved an unmixed blessing. . . .

According to Campbell, while the infant needs milk of some kind during the first nine or ten months of life, it does not need any after that period. Why should the young of man any more than the young of other mammals, require milk after it has left the breast? It is only since man first domesticated the cow and goat . . . that he has been supplied with any milk other than human, and it is absurd to suppose that before that time his health suffered from the lack of cow's or goat's milk. The preagricultural tribes to this day are without any, and until civilized man deteriorated them by the introduction of alcohol and European vices, they were magnificent physical specimens of manhood.— "Dietotherapy," Fitch, Vol. II, p. 764.

a strictly vegetarian diet may be brought up to the standard of a diet that is complete in all food essentials and capable of properly nourishing the body. We do not wish to be taken as recommending it for general use.

The value of milk and eggs, which would with the greatest difficulty be substituted, lies in the complete proteins contained. It has been made very evident that, with the proper use of fruits and vegetables, all essential vitamines and salts can be freely supplied. But in milk are found not only vitamines and salts, but also a high content of complete protein, thus making in milk a so-called "protective food." The difficulty in planning a diet without milk is in substituting its valuable protein. However, it seems that, with necessary knowledge and care, it is possible for it to be done.

## Vegetable Proteins

Available proteins in the vegetable world are those of cereals, legumes, nuts, and leafy vegetables. Referring to Chapter VI, pages 41-43, 62, we understand that cereal proteins are not complete, though some are more nearly so than others, and that the deficiency of one may be supplemented by the proteins of another. It is quite evident, therefore, that variation rather than monotony, is to be recommended in the dietetic use of cereal.

It has been shown (page 44) that, dietetically speaking, the seeds of plants, which include the cereals and legumes, are lacking in certain food elements; that while they are valuable sources of caloric food value, their supply of vitamines and mineral salts and complete proteins is too small to make it possible to depend upon them as the sole source of these essential elements. When the aleurone layer of whole-grain cereals is used, the proportion of vital food elements is greater.

We have seen, too, that the shortcomings of the seeds are supplemented by the dietetic value of the leaves, the leaves being rich in the very things in which the seeds are lacking. This makes quite obvious the value of utilizing both the leaf and the seed in various combinations.

## How to Combine Plant Foods

The secret, then, of successfully utilizing plants in the making up of a complete diet is: First, to avoid monotony in the use of cereal, and to so vary and combine cereals that the proteins of one may supplement the proteins of the other, and to use the whole grain instead of the refined product; second, to use, together with the "storage portion" of the vegetable (the root, tuber, and seed), a large amount of the "active respiring portion" (the leaf and the skin; see Chapter XII); and third, to re-enforce the vitamines, salts, and proteins of the vegetables, legumes, and grains with a free use of fruits and nuts.

## Nut Protein

As to the value of nut protein, we quote the following: "Peanuts are unusual in containing a considerable proportion of protein along with both fat and carbohydrate. Water-soluble vitamine is also not lacking. Experts in the office of Home Economics at the United States Department of Agriculture have shown that the nutrients of peanuts are easily digested by man. Johns and Finks, of the same department, have given an added worth to the food by demonstrating convincingly the high physiologic value of the peanut protein. . . . Bread made with a mixture of 25 parts of peanut flour and 75 parts of wheat flour furnished adequate proteins for normal growth of experimental animals."—*Journal A. M. A., Aug. 28, 1920.*

And again: " The food chemist . . . has long given to the various nuts a prominent place among concentrated foods. From his analytic standpoint, they may even surpass such recognizedly valuable foods as meats, eggs, and cereals in their concentration of nutrients. . . .

" Experiments that were conducted by Cajori at Yale emphasized anew what has long been contended by Jaffa, of California, namely, that nuts are valuable foods judged by their behavior in digestion and metabolism. They point out that if nuts are eaten properly and used in the diet as eggs, meat, and other foods rich in protein are eaten, they behave quite as well in the body as do the ordinary staple articles of food. . . .

" Their protein is, in general, of a superior quality. . . . In experiments just conducted at Yale University, Cajori has secured very satisfactory growth over long periods in animals on diets in which the almond, English walnut, filbert, and pine nut, respectively, furnished the essential source of protein in the ration. These proteins afford the necessary nitrogenous complexes for the elaboration of milk in the same species. From a study of the relations of diet to milk production in women, Hoobler pointed out, not long ago, that as a rule animal proteins are more efficient than vegetable proteins for the elaboration of human milk. However, nut proteins were an exception to this generalization, in that diets containing almonds, English walnuts, pecans, and peanut butter as a source of protein, proved to be as suitable for milk production as diets that furnished protein from animal sources. . . .

### Supplementary Foods

" These observations indicate that nuts are sources of abundant quantities of water-soluble B vitamine. . . . Furthermore, the nuts are logical dietary supplements to many foods like cereals, roots, tubers, and fruits.

There's a reason, as we now have learned."—*Journal A. M. A., Oct. 30, 1920.*

"The protein of almond meal was noted to have a 'biologic value' superior to that of wheat gluten."—*Journal A. M. A., March 8, 1919.*

There is much work still to be done along these lines, but we can begin to see great possibilities in intelligent vegetable food combination.

So now our food quartet (see page 220) is, fruits, vegetables, cereals, nuts, the nuts helping to take the place of the protein and fat of milk. However, we must not depend upon them to entirely take the place of the vitamines and the mineral content of milk. The leafy vegetables also are needed to supplement the dietary shortcomings of the legumes, so we see our dependence upon the leaves of vegetables in our meatless, milkless diet.

### Maintain Protein Standard

The principle is this: We must depend upon whole cereals, legumes, and nuts for *quantity* of protein, and upon leafy vegetables and vegetable extracts to supplement the other protein as to *quality*. This is not at all discouraging when we read of the quality of nut protein. We should still bear in mind the necessity for at least 200 calories of protein. If this minimum is adhered to, with a free amount of vitamines and mineral salts, there need be little danger of insufficiency in the total food supply. As protein, in nature, is ever combined with fat and carbohydrate, it becomes impossible to take 200 calories of protein without a goodly portion of energy food; for example, 15 calories of almond protein, if eaten in the almonds, carries with it 85 calories of almond fat, a concentrated nutriment. Twenty-five calories of legume protein means an accompanying 75 calories of carbohydrates. Added carbohy-

drate food may ever be found in cereals, in fruits fresh, stewed, or dried, and additional concentrated fat in olives.

Vegetable proteins never being supplied in a concentrated form, *the strict vegetarian, more than all others, must eat the very least amount of any artificial concentrated energy food, as free fats, cane sugar, etc., for he has not the concentration of animal protein to maintain his balance of nitrogenous foods.*

So to summarize:

1. Legumes, cereals, nuts, to make up necessary protein calories.
2. Leafy vegetables to supplement the above proteins, many of which otherwise would be incomplete.
3. Fruits and leafy vegetables to supply vitamines.
4. Fruits and leafy vegetables, with outer part of cereals, to furnish mineral salts.
5. Cereals, legumes, nuts, fruits, and olives to supply necessary added calories.
6. *Energy food in unnatural concentration used with caution.*

Suggestive daily menus are given as follows:

**Sample Breakfasts**

| No. 1 | Protein Calories | Total Calories |
|---|---|---|
| Fruit Salad | 13 | 181 |
| Nut Tomato Toast | 33 | 205 |
| Whole-wheat Gems (2) | 30 | 192 |
| Honey (2 teaspoons) | .. | 50 |
| Celery and Broth | 15 | 45 |
| Per cent of protein for the meal, 13½. | 91 | 673 |

For recipes, see Chapter XXXI.

There may, of course, be many variations in the fruit salad. The following is good: Cut up apples, bananas, oranges, add chopped nuts and raisins. A sweet dressing, if desired, may be made by adding honey to orange juice. Eat the celery raw. Cook the celery tops with

a little onion and tomato, and serve the broth salted to taste as a hot drink.

| No. 2 | Protein Calories | Total Calories |
|---|---|---|
| Grapefruit Salad | 25 | 275 |
| Baked Oats with Pea Tomato Sauce | 35 | 170 |
| Stuffed Dates (6) Stuffed with Almonds | 20 | 250 |
| Orange Juice (7 oz.) | 7 | 100 |
| Per cent of protein for the meal, 11. | 87 | 795 |

Make salad as given above, using almonds. Remove pulp from grapefruit and use grapefruit instead of orange. Add honey to grapefruit juice and use as dressing. Serve salad in grapefruit skin. (See recipe 76.) Add to a cup of oatmeal enough water to cover it, then salt. Let stand all night. In the morning bake slowly one hour. To two cups of pea purée, add a cup of strained tomato, salt to taste. Heat and serve over oatmeal.

| No. 3 | Protein Calories | Total Calories |
|---|---|---|
| Whole Grapefruit with Honey | 10 | 150 |
| Nut Tomato Rice with Lettuce | 26 | 206 |
| Whole-wheat Sticks (4) (or gems) | 14 | 144 |
| Stuffed Prunes (4) | 12 | 100 |
| Per cent of protein for the meal, 11. | 62 | 600 |

Prepare grapefruit the evening before. Loosen the pulp and add a teaspoon of honey to each half. Prepare nut tomato sauce as for nut tomato toast and serve with boiled rice. Or for this dish may be substituted macaroni, boiled, then baked in the same sauce. (See recipes 54 and 55.) For stuffed prunes, prepare as for stuffed dates, using almonds or walnuts.

| No. 4 | Protein Calories | Total Calories |
|---|---|---|
| Orange Juice (7 oz.) | 7 | 100 |
| Apple and Celery Salad | 5 | 75 |
| English Walnuts (6) | 20 | 200 |
| Cream Rolls (3) | 18 | 126 |
| Hot Malted Nuts | 27 | 150 |
| Per cent of protein for the meal, 12. | 77 | 651 |

To prepare hot malted nuts, see recipe 104. To make salad, dice one apple and add to two stalks of chopped celery. The walnuts may be chopped and added to salad, or may be served alone. Save celery tops for vegetable broth or soup.

| No. 5 | Protein Calories | Total Calories |
|---|---|---|
| Orange Juice (7 oz.) | 7 | 100 |
| String Beans on Graham Toast (vegetable butter) | 20 | 145 |
| Almonds (12) | 35 | 200 |
| Banana | 7 | 100 |
| Per cent of protein for meal, 13. | 69 | 545 |

| No. 6 | Protein Calories | Total Calories |
|---|---|---|
| Orange Juice (7 oz.) | 7 | 100 |
| Corn Bread | 18 | 130 |
| Vegetable Butter | .. | 50 |
| Protose and Potato Hash | 50 | 150 |
| Asparagus (large serving) | 8 | 25 |
| Baked Apple | 2 | 125 |
| English Walnuts | 10 | 100 |
| Per cent of protein for the meal, 14. | 95 | 680 |

Make corn bread according to recipe 3. Vegetable butter can usually be procured at any grocery, under the name nut margarine. Make the protose and potato hash according to recipe 46.

| No. 7 | Protein Calories | Total Calories |
|---|---|---|
| Fruit Salad with Lettuce | 20 | 300 |
| Purée of Green Peas on Toast | 29 | 150 |
| Whole-wheat Sticks (4) | 14 | 144 |
| Hot Peanut Milk (6 oz.) | 17 | 120 |
| Per cent of protein for the meal, 11. | 80 | 714 |

This is a large fruit salad. To make each individual salad, use half a banana, an apple, an orange, three or four walnuts, and about ten raisins. Serve with lettuce. For the purée, use fresh peas, cook them, press through a colander, season with a little strained tomato. Salt to taste. Moisten zwieback in hot water, butter with vege-

table butter, and cover with the purée. To make the peanut milk, emulsify a tablespoonful of peanut butter, adding water gradually up to six ounces. As the water is being added, stir in a third of a teaspoonful of honey.

## Sample Dinner Menus

| No. 1 | Protein Calories | Total Calories |
|---|---|---|
| Bean Tomato Soup (8 oz.) | 37 | 160 |
| Zwieback (2) | 28 | 200 |
| Spinach (large serving) | 15 | 50 |
| Browned Potatoes | 18 | 150 |
| Carrot and Nut Salad | 22 | 125 |
| Caramel Pudding | 5 | 150 |
| Per cent of protein for the meal, 13. | 125 | 835 |

Prepare soup stock according to recipe 25. To a pint of this soup stock, add a pint of strained tomato and two pints of bean purée. The water from the spinach may also be added. Make zwieback from whole-wheat bread. For browned potatoes, use recipe 59. For each individual salad, use one carrot grated and six almonds chopped. Add a French dressing. See recipe 86. For the caramel pudding, make a fruit sauce. See recipes 107 and 93.

| No. 2 | Protein Calories | Total Calories |
|---|---|---|
| Vegetable Bouillon | 24 | 93 |
| Zwieback (2) | 28 | 200 |
| Baked Purée of Lentils with Nut Tomato Sauce | 50 | 200 |
| Mashed Turnips (3 tablespoons) | 3 | 10 |
| Lettuce | 3 | 10 |
| Farina Mold with Nuts and Raisins | 35 | 269 |
| Per cent of protein for the meal, 19. | 143 | 782 |

For bouillon, see recipe 23, but use broth from lentils instead of bean broth. Turnip water may also be substituted for potato water. Cook one cup of lentils, drain well, press through a colander. Two tablespoons of grated onion and ½ cup of zwieback crumbs wet up

with tomato juice may be added. Salt to taste. Bake slowly in oven for 30 minutes. Any other legumes may be used instead of lentils. Serve with sauce made according to recipe 69. (See also recipe 58.) For farina mold, use recipe 92, but add to this a dozen nuts chopped and about four dozen raisins.

| No. 3 | Protein Calories | Total Calories |
|---|---|---|
| Tomato Corn Soup | 30 | 169 |
| Zwieback (2) | 28 | 200 |
| Baked Lima Beans | 32 | 150 |
| Mashed Potatoes | 10 | 106 |
| Cauliflower | 7 | 12 |
| Combination Salad | 7 | 35 |
| Stuffed Dates (4) | 8 | 100 |
| Grape Juice (7 oz.) | 2 | 100 |
| Per cent of protein for the meal, 14. | 124 | 872 |

For soup, add to one cup of potato soup stock one can of tomatoes strained and one can of corn (with or without puréeing). Thin with water from the cauliflower. Salt to taste. Boil the Lima beans one hour, then place in oven and bake. Prepare potatoes early so that the broth from the skins may be added to the Lima beans when they are put in to bake. The beans will need no other seasoning than salt.

| No. 4 | Protein Calories | Total Calories |
|---|---|---|
| Tomato Gluten Soup | 23 | 103 |
| Zwieback (2) | 28 | 200 |
| Braised Protose | 49 | 110 |
| Beets with the Tops | 8 | 40 |
| Stuffed Potatoes | 15 | 150 |
| Celery (3 stalks) | 5 | 20 |
| Olives (5) | 5 | 100 |
| Per cent of protein for the meal, 18. | 133 | 723 |

For the soup, use two cans of tomatoes, strained. Add to this a pint or more of the water in which the beets are cooked. Salt to taste and thicken as desired

with 20-per-cent gluten. (See also recipe 29.) Any other vegetable water may be used instead of the beet broth, or simply the tomato may be used. For protose and stuffed potatoes, see recipes 44 and 61.

| No. 5 | Protein Calories | Total Calories |
|---|---|---|
| Protose and Potato Hash | 50 | 150 |
| Baked Squash | 3 | 43 |
| Lettuce and Tomato Salad | 10 | 35 |
| Graham Bread | 14 | 100 |
| Vegetable Butter | .. | 50 |
| Cereal Pudding | 12 | 275 |
| Orange Juice | 5 | 75 |
| Almonds (6) | 15 | 100 |
| Per cent of protein for the meal, 13. | 109 | 828 |

For the hash, mix potatoes and protose in the proportion of three potatoes to one-half can of protose; chop and mix thoroughly; warm in an oiled pan or bake in a slow oven. Chopped onion may be added. (See also recipe 46.) Make the salad according to recipe 78 and serve with French dressing.

| No. 6 | Protein Calories | Total Calories |
|---|---|---|
| Tomato Bisque | 14 | 75 |
| Zwieback (2) | 28 | 200 |
| Bean Croquettes (2) | 58 | 238 |
| Spinach (large serving) | 15 | 50 |
| Orange Jelly | 2 | 97 |
| English Walnuts (4) | 13 | 130 |
| Per cent of protein for the meal, 16. | 130 | 790 |

Make the tomato bisque, bean croquettes, and orange jelly according to recipes 36, 40, and 100.

| No. 7 | Protein Calories | Total Calories |
|---|---|---|
| Vegetarian Consommé | 36 | 65 |
| Zwieback (2) | 28 | 200 |
| Green Peas (4 tablespoons) | 28 | 114 |
| Mashed Potatoes | 15 | 150 |
| Lettuce and Carrot Salad | 4 | 20 |

| | | |
|---|---|---|
| Almonds (6) | 15 | 100 |
| Dates (4) | 1 | 100 |
| Per cent of protein for the meal, 15. | 127 | 749 |

To make the vegetarian consommé, boil the potato skins; strain, add the water in which the potatoes are cooked and the green pea water. Strain the contents of a can of tomatoes and add to the above. Care should be taken that the consommé is not too watery. This can be avoided by adding only enough water to the vegetables to cook them and leave a concentrated broth. (See also recipe 37.) After the potatoes have been thoroughly mashed, add for seasoning a peanut cream made by emulsifying peanut butter in enough water to make it the consistency of milk or cream.

The rather high protein percentage of the dinner menus, it may be noted, tends to balance the lower protein content of the breakfast. For those who need more calories at a meal, the servings may be larger. If more protein is needed, the servings of the protein foods may be increased. There is still a third meal to be had, which may be made to furnish extra protein or energy food, as required. This third meal should be simple and include a goodly portion of fruit or of fruit and raw vegetable salad. In addition to this, a vegetable broth or soup may help to increase the valuable vegetable elements upon which we must to a great extent depend to take the place of milk. This, with Graham bread or zwieback, will be found very satisfactory. A half dozen almonds eaten with this meal will add 15 calories of good protein.

The above menus are only suggestive, and serve to show possibilities for satisfactory and nourishing meals without the use of dairy products.

# CHAPTER XXV

## PRINCIPLES OF FEEDING THE SICK, AND THEIR APPLICATION IN ACUTE DISEASE

Our aim in this chapter, and in those immediately following, is not in any sense to give a complete outline of the diet in any of the many and varied forms of acute or chronic disease. Our space will not permit, neither do we feel that such an outline should be included within the scope of a book, the contents of which are suggested by a title such as has been given to this. The diet in any disease should be suggested by the physician in charge, along with lines of treatment other than dietetic. However, there are so many fads in connection with dietetic treatment of disease, and withal, such a woeful lack among mothers and housewives, of a knowledge of scientific principles of feeding, even in the most common of ailments, that we do not feel that we are too greatly exceeding our bounds in showing how the principles of dietetics should be applied under conditions of sickness and ill health. We would seek to show that the principles are the same and the difference of application not great. The important, underlying principles of feeding, in sickness as well as in health, we believe, should be understood by every homekeeper.

### The Same Foods Needed in Sickness as in Health

When a person is sick, it is quite as important as it is when he is well, that his body be supplied with all the food essentials. The great differences are, first, that, because of inactivity, his caloric needs are less; and, second, that the more or less weakened condition

of the digestive organs makes it necessary that his food be given him in a very easily digested form.

As is well known, of all food elements, the body soonest suffers from an insufficient supply of water, and this should always be supplied freely.

### Constant Food Essentials

After this the fairly constant food essentials in health are, (1) vitamines, (2) mineral salts, and (3) proteins. The normal variation in the diet of any two individuals is in the amount of starch, sugar, and fat they may need to make up their total caloric food requirements, this being dependent upon their height, habits, and tissue activity. The enforced inactivity of the one who is sick automatically lessens his caloric food requirements, which obviously should mean a lowering of his intake of carbohydrates and fats, the strictly energy foods.

### Vitamines, Salts, Protein

Vitamines, with their vitalizing power, he may need even more than in health; of mineral salts, with their alkalizing properties (see Chapter X), he has an especial need, for ever in sickness the body tends toward a condition of acidity, making it more difficult for it to maintain its normal degree of alkalinity; and of protein, the tissue restorer, he cannot be long without, because of the extra tissue waste so often accompanying the process of disease. The supply of carbohydrates and fats needed depends upon the length of the illness, the power of the patient to digest and assimilate food, and the degree of the body and tissue activity.

### Food in What Form?

The kinds of food required having been decided upon, the form in which the food is to be given is of great importance, and this depends upon the ease with which

the patient is able to digest food. As a rule, however, food, simply prepared, not too rich, and of a kind and form that is easily digested, is the best. The likes and dislikes of the patient should be considered and should have an influence in so far as they do not affect the healthfulness of his food and the good that he may derive from it. It is well known that other things being equal, the keener the relish for food, the greater the good the system is able to get from it.

## The Food Quartet

In all cases of feeding, it is important that the following foods be included in the dietary: (1) Fruits, (2) vegetables, (3) milk, (4) cereals. With this simple quartet it is possible to furnish a well-balanced ration, whether the one who eats be sick or well. If any one of the four be lacking, the diet is open to question, and should be carefully investigated. With every individual patient we may be called upon to feed, we are to examine his diet with reference to these four foods. Are they included in his dietary? If not, why not? This is not to say that the diet of every acutely sick person should include all of these, for there are cases where, for a very short period, nothing perhaps, not even water, should be allowed to enter the stomach, as in some cases of acute appendicitis, where, for any reason, operation is delayed; and, as has been said in Chapter XXII, there are times and conditions of auto-intoxication, acute or chronic, where complete absence of food for a few days may result in great benefit.

## Colds

In short, acute illnesses, as in colds, tonsillitis, etc., a diet limited for a short time to fruit juices, or to fruit juices and vegetable broths, with the vitamines and mineral salts thus supplied, may be the very best that can

be planned; but whenever the invalid state becomes at all protracted, a thorough study should be made to determine whether or not there are being given all the food elements necessary to keep the body in the best possible state of nutrition, and thus hasten recovery.

In what forms, then, shall the foregoing foods — fruits, vegetables, milk, and cereals — be supplied to the acutely ill person? What is the order of their importance as regards the body need and ability to utilize them under the stress of illness?

### Fruit Juices

Fruit juices are of the utmost importance in the feeding of the sick. First, they are a help in supplying the large amount of water so often needed. Second, they are rich in vitamines, without a free supply of which the body would often be unable to cope successfully with disease. Third, they furnish, in spite of their naturally acid properties, certain alkalinizing salts (see Chapter X), which help to maintain the normal reaction of the blood against the excess of acid wastes that so often, in illness, rapidly accumulate. Fourth, they contain actual caloric food value, in a predigested form, and easily assimilated. Fifth, the fruit acid is a natural disinfectant and cleanser, and also stimulates normal peristaltic action, thus helping to prevent a stagnant condition of the digestive tract.

In many an illness, if not too protracted, a patient may be carried through on a diet of fruit juices. In this way a caloric intake of from six hundred to one thousand calories daily can easily be given, and this in the form of dextrose, which imposes no tax on the digestive powers, but being quickly picked up by the blood stream and at once utilized in the tissues, acts as the natural stimulant the body so much needs. Fruit juices

should be first thought of when, for any reason, a patient's diet needs to be greatly restricted, and unless there be some special contraindication, should be included, no matter how much other food he may be able to take. It is better not to add sugar to these juices.

### Vegetable Broths

Ranking with fruit juices in their importance, and making a most valuable addition to the aforementioned diet, are vegetable broths. These furnish, first, vitamines, thus re-enforcing the vitamines supplied by the fruit juices, and in case the fruit juices are for any reason not being given, may be made of themselves to supply a sufficient quantity of these life-giving ferments.

Second, they supply mineral salts, and these, seemingly in greater quantities and in more varied forms than fruit juices do. They furnish such important mineral elements as calcium, iron, phosphorus, and potassium, which not only work with the fruit juices in maintaining body alkalinity, but also enter largely into the formation of body tissues. (See Chapter X.)

Third, a certain amount of protein is also furnished by vegetable broths, the amount being dependent on its preparation. A cup of vegetable broth, made after recipe 24, may contain 19 protein calories to a total of 46 calories, or 41 per cent protein. This gives an added value of very greatest importance, because of the great need in sickness of tissue-building food, and the necessity for supplying it in an easily assimilated form.

The proteins of vegetable broths are complete (see Chapter VI), and furnishing as they do the important trio, vitamines, mineral salts, and complete proteins, they supply to the body in a form most easily utilized, the food elements essential for sustaining life. Used in connection with fruit juices, with the added carbohydrate content of the fruit juices, they furnish to the

acutely sick patient, whose vital powers must all be used in fighting disease, the first and perhaps the only essential foods necessary to carry the fight to a victorious finish. In some cases, when the stomach is irritable, or when it seems best to limit the peristaltic activity of the bowel, as after abdominal surgery, vegetable broths may be taken better for a time than fruit juices. Vegetable broths alone may sustain the patient for many days, fruit juices being added as soon as the patient can take them.

The value of these vegetable juices has not been fully appreciated, but should be well understood by every one having anything to do with the feeding of the sick. They should in some form have a place in every invalid dietary, and in some acute conditions may be the only food a patient can take. (See recipes in Chapter XXXI.)

### Additional Calories

Our patient, then, during the height of his acute illness, has had supplied to him through the medium of fruit juices and vegetable broths the vital trio,— vitamines, mineral salts, and complete proteins,— but as the days go by it should be remembered that such a limited diet has been only for an emergency, and that he soon must have additional calories supplied him, especially in the way of protein. Otherwise, his system will suffer for want of sufficient protein food to take the place of excessive body waste. His total calories must also be increased.

### Importance of Milk

Therefore, the food next in importance, and one which should be added as soon as possible, is milk. Milk is a food of great value. It supplies, first, protein, and that in the form of complete protein; second, fat in an emul-

sified form, the form in which fat is most easily digested; third, carbohydrate in the form of milk sugar; fourth, mineral salts; fifth, vitamines. Because of the completeness of its food content, milk has been called a protective food. (See Chapters XIV and XXVIII.)

### Boiled Milk

The sooner milk can be added to the diet of the patient, the sooner will it be possible for the body to be restored to its normal state. But milk often makes trouble. In its raw state it is sometimes difficult of digestion. Because of the large curds which form in the stomach as a result of the action of the gastric juice on the milk, it must be considered a solid food. For this reason many invalids who need the food value of milk seem unable to take it well. But it must be remembered that milk can be taken in several different forms. Milk can be changed from a solid food, comparatively difficult of digestion, to a relatively liquid, easily digested food, by boiling. Milk that has been boiled forms in the stomach fine, flaky curds. These fine curds are nonirritating and easily mixed with the gastric juice. It is true that we must consider a certain deterioration in the vitamine content due to the heating of the milk, but if the milk is fresh and boiled not longer than three minutes, and served soon after boiling, this deterioration is slight. At any rate, because of the abundance of vitamines supplied the invalid in the way of fruit juices and vegetable broths, we need have no fear as to his getting enough of this valuable element. The protein, fat, and carbohydrates of boiled milk are quite as valuable as that in raw milk and are in a form that can be well cared for, even by one with a weak digestion. The boiling of the milk greatly increases the digestibility of its protein.

That part of milk often the most difficult of digestion is fat. Therefore, skim milk is a simpler, more easily

digested food than whole milk, and in some cases when milk is first given it is well to give it as skim milk, gradually adding the cream later. Often in cases of severe illness, as in fevers, the diet problem may be solved by the use of the three foods, fruit juices, vegetable broths, and boiled skim milk, the skim milk supplementing the low-protein content of the first two. The added food value of the fat in the actual calories which it contains may mean much in protracted illness, and the cream of the milk should be given, if it in no way interferes with the utilization of the other foods. However, it must be borne in mind that in acute illnesses, fevers and infections, fat is usually not well borne, and often, for a time at least, has to be excluded from the diet.

### Buttermilk

Buttermilk is a very good form in which to give milk. It supplies all the elements except the fat, and the lactic acid content of the milk tends to inhibit intestinal putrefaction.

### Cereal

Our simplest steps having been enumerated, we have reached the last mentioned of our essential food quartet, that is, cereal. In cereal we have a valuable means of adding caloric food value. By this addition we are able to bring our patient's daily ration up to the total food value needed to overcome his more or less emaciated condition and restore him to health and strength. That cereal has a distinctive food value of its own, apart from simply its calories, cannot be gainsaid, for it has been shown that babies have often gained in weight when cereal has been added to their diet, even though the addition of the cereal has been, to a large extent, substitution and not necessarily an increase in the total calories.

But in what form should cereal be given to one whose digestive organs have been weakened by illness? Dextrinized cereals, or cereals in which the starch has been changed to dextrin, the first step in starch digestion, are the best. Dextrinized cereal may be made into gruels, as corn-flake gruel, wheat-flake gruel, shredded-wheat gruel; or it may be given as zwieback, dry, or as milk toast. Gruels may also be made from nondextrinized cereals, as oatmeal, cream of wheat, rice, and others, if they are sufficiently well cooked. After thorough cooking, they should be strained, properly thinned, usually with the addition of milk, *not cream.* Evaporated milk may often be added to these cereal gruels, with pleasing results and without the disadvantages of cream. Zwieback (oven toast) is often the first solid food well borne. It may be allowed very early with vegetable broth, or with boiled milk.

## Other Foods

When our acutely sick patient has reached the place where these forms of the essential food quartet — fruits, as fruit juices; vegetables, as vegetable broths; milk, as boiled, skim, or buttermilk; cereals, as zwieback or dextrinized gruels — can be given him, his diet possibilities are complete, and the only other forms of foods that we need to consider for him are the various combinations and the more solid varieties of these same four foods.

To his fruit juices may be added the fruits themselves, it ever being remembered that stewed and dried fruits, while good for furnishing calories, can never be made to quite take the place of fresh fruits or juices. To the vegetable broths may be added the vegetables, first as soups and purées, then as the more tender vegetables. Baked potatoes, asparagus tips, spinach, tomatoes, tender green peas, and others may be gradually added. Milk

may be combined with vegetable purées to make appetizing cream soups. With boiled milk may be allowed some raw milk, if the patient prefers and if he can take it well. Cottage cheese is a valuable form in which to supply milk protein. It may be served as cottage cheese omelet (see recipe 48) ; or it may be served with cream, thus making its food value approximate that of whole milk. Eggs, though not mentioned as one of the four essential foods, find their place here, and may take their turn with milk, preferably soft boiled or poached.

Instead of limiting the cereal part of his food simply to cereals and zwieback, we may allow him a piece of bread (thirty-six hours old) and we may venture for him a bit of breakfast mush. However, as long as he remains an invalid, even though a convalescent one, it must be remembered that he can take more calories in the form of zwieback and gruel than in the form of bread or mush, because of the greater ease to digest the first-mentioned form of foods.

As he becomes a convalescent, his total calories must be brought up to the amount necessary to restore him to his normal weight and strength. The wasted patient will need extra protein calories to restore tissue. These may well be supplied in milk, eggs, cottage cheese, almonds (if well masticated), gluten gruel, whole-wheat bread, vegetable soup in which skins and leaves of vegetables are utilized, and in purées of legumes, as Lima beans, green peas, etc., and for those who feel that they must have it, a moderate amount of the least harmful meat, as mutton, lamb, and chicken. Extra calories for energy and to replace wasted fatty tissue may be supplied, not only in connection with the aforementioned foods, but also as sweets in the form of honey, meltose, dates, and other dried and stewed fruits, as prunes, figs, apple sauce, and baked apple.

## Free Fat

Fat, the most concentrated food, is best furnished in milk with its cream, in olives, and in nuts. Free fat should be used sparingly in all cases of illness, for non-emulsified fat is ever a deterrent to digestion. During the acute stage of illness, no cream (except as given in whole milk), butter, or other free fats should be allowed. In some cases, milk may be taken if partly or wholly skimmed, when the addition of the cream might make it impossible for the patient to utilize the milk.

In convalescence, whole milk should be given, if possible, and in some cases some extra cream may be added. This, however, should be done carefully. The number of calories needed daily must depend upon the needs of the patient, the degree of emaciation, his activity, and his ability to care for the food ingested.

It should ever be borne in mind that only food properly digested can be utilized. The more easily digested the food, the more calories will the patient be able to care for; and if overeating is bad in health, it is surely worse in disease.

The above-mentioned foods do not cover all the foods that may be allowed the invalid in every case, but the outline forms a working basis which may serve as a check-up on the dietary essentials, and to these may be added other things as the patient desires and seems able to take.

## Questionable Foods

Foods questionable in health, should, of course, not be allowed in disease, and dishes should ever be prepared with due regard for simplicity, both as to the individual dish and the variety served at one time. During the height of the illness one dish, as fruit juice, a vegetable broth, a soup, or a gruel, should be served at a time;

while during convalescence a simple variety of two or three simple dishes is often better than a greater number of foods served at the same meal.

### Frequency of Feeding

While the patient is able to take only a liquid diet, it is usually necessary to feed him more frequently,—sometimes every two hours, or even oftener, dependent upon the amount taken at one time. If his diet is limited to fruit juices or vegetable broths, these may be given freely as often as every half hour. It should be remembered that no rule can be given that will hold good in every case, and that there are exceptions to all rules. However, with a working knowledge of dietetics, and of the principles as outlined in this chapter, the problems of feeding the sick are greatly simplified, and the resources of the one bearing the responsibility greatly increased. And without a knowledge of these principles a given diet for any given disease may be all wrong for an individual patient, for we must feed the patient and not the disease.

### Practical Application

So, if Mary has a cold, increase her vitamines, lessen her calories, and give her only the simplest food. For twenty-four to forty-eight hours (some cases longer), limit her to orange juice with lemon and other fruit juices, and vegetable broths. Then add boiled milk and hot milk toast, or cream soup (see recipes, Chapter XXXI) with hard toast. See that she has water freely. After this, and until her cold has quite disappeared, allow her only the dextrinized cereals, milk from which all or part of the cream has been removed, fruits, and vegetables. Limit her butter, and let her sweets be only those natural sweets found in the fruit she eats.

### Measles, Scarlet Fever, Influenza

On this program her cold will quickly disappear, but if her cold proves to be the initial stage of measles, scarlet fever, or influenza, the dietetic program instituted puts her in the best possible condition to combat the disease. As the disease progresses, continue the free use of fruit juices and vegetable broths, and in addition to this, such other of the simple foods already mentioned as necessary to maintain her proper nourishment.

Her vital forces being engaged in combating the onslaught of infection, her food must all be such as will place the least added tax on her digestive powers. Necessary added nourishment may for a long period be given in boiled milk, with or without the addition of zwieback or other dextrinized cereal; or in the form of corn-flake or wheat-flake gruel; or a combination of milk with vegetable purée to make a vegetable soup. In addition to liberal amounts of fruit juice, some solid fruit may be given if desired, as scraped apple or soft pear. It is very important that *water be given in ample amounts.*

### Typhoid Fever

The same principle of feeding applies to the grown-up. If some member of the family be so unfortunate as to contract typhoid fever, or a case of influenza is prolonged into the so-called typhoid type, again we have the same proposition before us, that of supplying, over this protracted period, an abundance of vitamines, mineral salts, and complete proteins, with enough of other easily digested food to prevent depression of the vital forces by the undue wasting of the disease.

If the patient is to stand well the siege of typhoid fever, he must be properly nourished, and again our diet list reads: Fruit juices and vegetable broths freely; boiled milk, buttermilk, vegetable soup, cereal gruels,

most often the dextrinized cereals, as corn-flake and shredded-wheat gruel. So little being taken at a time, the meals must be frequent, with free supply of fruit and vegetable juices in between the times for more concentrated food. In fevers, meat is especially difficult of digestion because of the lack in the stomach of the normal hydrochloric acid upon which meat digestion in the stomach depends. Because of this deficiency in the digestive juice, as well as the general weakness of all the organs, digestion is necessarily much retarded. The inhibitory action of free fat upon the digestive processes is another reason why free fat should not be given these patients. (See Chapter VII.)

### Bilious Attack

Perhaps some member of the family has a digestive upset, a bilious attack, with foul breath, coated tongue, headache, with or without diarrhea. The alimentary tract being already overburdened, the problem of the food supply resolves itself into the question of giving the stomach and bowel a chance to clear themselves of stagnant material, without the added task of digesting more food which could not well be utilized. So once more we give our patient plenty of water, with fruit juices freely, limiting his diet to these for perhaps twenty-four or forty-eight hours, when, with other treatment directed for the relief of the overwhelmed digestive tract, the symptoms are relieved.

# CHAPTER XXVI

## PRINCIPLES OF FEEDING THE SICK AS APPLIED IN CHRONIC CONSTITUTIONAL DISEASES

FITCH says that "chronic diseases are chiefly the outcome of injudicious or pleasurable indulgence at the table."[1] If this be even to an extent true, it suggests the thought that in the treatment of such diseases the dietetic program can play no unimportant rôle.

But how shall the principles of feeding be applied in chronic disease? This is often a great problem, for the very chronicity of the disease makes it all the more important that the patient be daily supplied with all the food essentials and with sufficient calories to maintain his strength and normal weight.

### Study the Patient's Diet

The first thing to do is to study the diet of the individual, and see wherein there are deficiencies. Is he getting an abundance of vitamines? Does his daily ration include an ample supply of mineral salts? Is he getting enough protein and of the proper kind? If he is a victim of a wasting disease, how much does his ration lack of that amount necessary to prevent further wasting, or, if possible, to build the extra tissue needed to restore that which has been lost? How many calories is he getting daily? And is he maintaining his weight, gaining in weight, or continually losing? In many cases all we can hope to do is to keep him from losing more. If he suffers a progressive loss of weight that continues indefinitely, he stands no chance of recovery unless the tide can be turned in the other direction. But if he is

[1] "Dietotherapy," Vol. III, p. 4.

to recover, at some time his diet must be increased to the amount necessary, not only to maintain, but gradually to increase his weight.

### Weigh the Patient

Whenever possible the patient should be weighed at regular intervals, for this should tell us as much, and be as valuable an aid, as in the feeding of infants, where we so regularly weigh our little patients. If, because of weak digestion or other reasons, his calories must, of necessity, be low, *let the deficiency be in carbohydrates and fats, rather than too greatly in proteins*, and let the diet include an abundance of those essential foods that make it possible for the body to put up a good fight.

### In What Form Should He Take His Food?

Make a list of the foods which should be given him, including the food quartet mentioned in Chapter XXV, and determine the form in which he can most easily digest them. For example, must his fruits be limited to the juices, or may he be allowed the whole fruit? Must his vegetable essentials be given as broths and purées, or can he take the vegetables themselves? In what form will he most easily digest cereal, and how should he take his milk — boiled, skimmed, as whole milk, buttermilk, junket, or cottage cheese? May he be allowed eggs as well?

### If Obese or in Good Flesh

If the patient is obese and may well afford to lose flesh, reduce in carbohydrates and fat calories, remembering that these may be varied safely, but beware of any great reduction in his protein calories, lest his tissue and muscle suffer loss. Remember that a daily protein ration of 200 calories is a *low protein* ration, the Chittenden standard of 200 to 300 calories, rather than the Voit standard of 400 to 600 calories. Do not for-

get that much less than this minimum of 200 calories cannot safely be maintained for more than a short period, and that often 250 calories would be better. Remember that vitamines are needed the more if for any reason the protein must be low, and that mineral salts must be freely supplied to overcome the often decreased alkalinity of such individuals.

### Two Types

We have seen that in their systemic response to dietetic error, there are two classes of individuals, and this leads us to the possibility of dividing chronic constitutional disease into two great classes. (See Chapters III and IV.)

First, the *auto-intoxication* type includes all those conditions due to imperfect digestion; second, the *suboxidation* type, those conditions in which, because of a good digestion, the results of wrong eating are not felt until the food has left the digestive tract and has been absorbed into the blood stream. Undoubtedly the two types often overlap, and an extreme condition of one type is impossible without some of the conditions typical of the other. As for instance, stagnation in the digestive tract cannot exist to any extent without hindrance to normal conditions of oxidation and metabolism in the tissues; nor can an extreme state of suboxidation be present without some degree of interference with the digestive activities, whether in the stomach, intestines, or liver, and some amount of accompanying intestinal toxemia. However, individuals usually approximate closely enough to type to allow us to place them, and this classification gives us a convenient basis for dietetic treatment.

### The First Type

In the *auto-intoxication* type, we see the thin, long-waisted, dyspeptic, catarrhal, constipated individual —

nervous, neurasthenic, despondent, often classed as a nervous dyspeptic. His digestive disturbances are many, and he is afraid to eat, for everything produces fermentation and distress, and if perchance he is able to eat, it seems that the more he eats, the thinner he gets. These individuals are almost invariably on a deficient diet, whether they eat little or much. A careful investigation of their diet will undoubtedly show that it is deficient in vitamines, deficient in mineral salts, deficient in protein, even though, at times, excessive in calories. After a time, however, their diet also becomes deficient in total calories, because, as a result of the devitalized diet and condition, the digestive tract becomes less and less able to do its work. But whatever stage these individuals have reached, the first thought for them must be to add to their diet those foods that will supply vitamines, mineral salts, and complete proteins.

### He Must Have Fruit

In many cases, these persons do not think they can take fruit — but fruit they must have. Let them venture fruit in the form of fruit juices taken an hour or half an hour before meals, or at bedtime. In this way fruit juices can almost invariably be taken without causing trouble, and may save the day, even if fruit cannot be taken in any other form. However, these patients will often find it possible to take fruit at mealtime, if they take it alone as the only food at the meal,— for example, a fruit breakfast or a fruit supper,— or if they eat it at the beginning of the meal before other food has been taken.

### Vegetable Broths Have a Medicinal Value

Fruit deficiency can to an extent be made up by a free use of vegetable broths. These can be used freely at mealtime, as bouillon, in vegetable soup, and can be taken as a drink between meals. At least a pint of

fruit juice or of vegetable broth — better, both and more — should be taken daily. Fruit juices and vegetable broths taken freely will soon show a marked beneficial effect on the constipation so constant with this type of individual, thus removing one of the most potent factors in the cause of his ill health.

### His Protein Ration

Let us next look to his protein. Is he getting 200 or 250 calories of protein daily? These patients particularly need an ample protein ration, but often we hear them say: "I cannot take milk." All right, let them try taking boiled milk, and great will be their surprise to find that the fine, easily digested curds of boiled milk cause no trouble, and the system soon responds to the stimulus of the protein nourishment for which they have been starved so long. These patients have often been afraid of eggs. Some one has told them that eggs will make them bilious, but if vitamines are freely supplied, the extra tax of digesting an egg or two daily will usually be well borne, especially as they supply much-needed protein. The yolk of the egg also supplies iron and a goodly amount of vitamine. Cottage cheese, an excellent protein food, is usually well borne by every one. It may be served plain or with cream or as cottage cheese omelet. (See recipe 48.) Buttermilk is valuable, and if taken with a spoon instead of being drunk as an ordinary liquid, it usually will cause no trouble. Vegetable soups, made from recipes in Chapter XXXI, are valuable protein additions, and the more tender leafy vegetables, as cauliflower, spinach, etc., can be taken, with their protein, mineral, and vitamine value. Reference to calorie tables (see Appendix) makes comparatively easy the calculation of the amount of protein taken, which, as has been said, should be not less than 200 calories; more, in many cases, would be better.

### How to Gain in Weight

*The vitamines, mineral salts, and proteins* being supplied, the question of calories must next be considered. The thin individual needs more than enough to maintain his weight and strength if he is to gain flesh, but he will do well for a time to content himself with a maintenance ration until his digestive organs, under the new régime, have attained greater strength and his system is free from all accumulated wastes. By watching his calories daily and the scales weekly or biweekly, it is possible to find the maintenance diet. How little can he eat and not lose?

After a short time, to his maintenance diet may be carefully added extra calories in the way of such concentrated foods as olives, dates, prunes, nuts well masticated. Begin perhaps with six olives three times daily, or three dates and three almonds at each meal; or prunes for breakfast, almonds for dinner, dates for supper, in addition to his previous regular dietary schedule.

Cereals in various forms help to make up necessary calories and, if whole cereals, they supply some mineral salts and a limited amount of vitamines as well, and should be taken as hard toast, dextrinized cereals, and gruels. Browned rice (see recipe 21) is easily digested.

In the initial dietary treatment, these patients gain nothing by eating cream, butter, and olive oil. These foods often hinder the digestion to the extent that the patient does not get the full benefit of any of the food he eats. Later, however, cream may be taken by some, and if well borne, is a valuable means of adding calories in concentrated form. It can very easily, however, be overdone; and at all times, butter and oils should be used very sparingly, as they are ever a hindrance to digestion, and tend to increase the general catarrhal conditions to which these individuals are often susceptible. (See page 52.)

In checking up, let the patient note whether or not his diet includes each of the four kinds of foods mentioned as the important quartet in Chapter XXV. He must be getting fruits, either as fruit juices or as fruits eaten alone, or at the first of the meal; vegetables, as broths, soups, leafy vegetables, including, if possible, some raw vegetable daily. He must be getting milk or other dairy product, as boiled milk, buttermilk, cottage cheese, or eggs; and cereals, as oven toast, gruels, stale bread, rarely mushes.

It is quite possible for his diet to include all of the above foods in some of their forms, and if they are included, and if the proportion of fruits and fruit juices, vegetables and vegetable broths, is ample, his diet is complete and he has taken a great step toward the surmounting of his physical difficulties. And let him remember that, whatever he eats, he must chew, chew, chew.

To summarize then: The point is, for this thin dyspeptic to have supplied to him freely the essential foods; find his maintenance diet as to calories, and after two or three weeks, gradually push his calories beyond his maintenance diet until he gains in weight. But let him remember that *often a decrease in diet, with a cutting out of his excess of butter, must come before it will be possible for him to add to his diet the extra calories necessary for him to gain his desired weight.*

An initial loss of a pound or two during the first week may be an advantage. It is often a help in finding the maintenance diet, and can soon be followed by a satisfatcory gain.

### Gastric Ulcer

Cases of gastric ulcer usually occur in persons of this type, and with a few modifications, the feeding principles are the same. With these the condition of irritation in the stomach has progressed to the extent

that the mucous membrane has become abraded, and an ulcer has formed. All food taken, then, must be in a bland, demulcent form, which will soothe rather than increase the irritation. Accordingly, those usually best taken are cereal gruels from which all cellulose has been removed, boiled milk, cream, soft eggs, with dependence upon vegetable broths rather than upon fruit juices for vitamines and salts. Vegetable broths should be given freely. Later, vegetable purées, baked potato, subacid fruits, and fruit juices. Fruit juices may in many cases be allowed, carefully, from the first. It should ever be remembered that the proper nourishment of the individual is an important factor in the production of a cure.

### Constipation

Constipation being so characteristic of this type of individual, we cannot forbear giving it a word in passing, though it would be impossible for us to dwell at length upon a subject about which so much might be said. However, this we will say: If an individual's daily ration is well balanced, containing a sufficient amount of vitamines in the way of fresh fruits and vegetables, and if he does not overeat, he seldom needs to be troubled with constipation. Overeating is often a cause of constipation. Constipation is a phase of intestinal indigestion, and is often due primarily to the packing of the intestinal tract with an excessive amount of concentrated food, making it impossible for the musculature of the intestinal wall to properly do its work in mixing the food and passing it on in a normal length of time. If the bowel is not crowded with too concentrated a mass of food, there need be no resulting constipation. Cellulose is helpful in that it gives bulk that is light and without concentration, and the gentle stimuli of the vitamine foods are also needed to insure normal peristaltic activity.

A free amount of fruit in the daily diet may be considered absolutely essential to good bowel drainage. (See Chapter XI.) If, after planning a carefully balanced ration which furnishes proper nourishment and does not overcrowd the digestive tract, the individual is constipated, it usually means that he needs more fresh fruit. A glass or two of fruit juice, orange juice ranking first, between meals or at bedtime, in addition to a free amount of fruit taken with at least one meal of the day, will usually solve the difficulty.

### Some Foods Too Irritating

The cellulose of fruit and vegetables and whole-wheat bread is usually sufficient without bran, so commonly used, which in many cases is irritating to the sensitive mucous lining of the digestive tract. In cases of *long-standing constipation* resulting in a sore, irritable, and oftentimes contracted bowel, the stagnant condition can best be combated by a bland diet, complete as to food essentials, but with a minimum of the coarser, more irritating foods, such as vegetable cellulose and even fruit fiber. In some of these cases the laxative effect of fruit juices must be relied upon, the cellulose of the fruit not being well borne at first, but added a little later. Vegetable broths, soups, purées, and the more tender vegetables may be used, eschewing the coarser variety. These cases are only made worse by anything producing an irritating effect, as bran, or even the mild laxatives.

Boiled milk, contrary to the popular opinion, is not constipating, but in long-standing cases of constipation it is much less liable to cause intestinal indigestion than raw milk. (See page 267.) Whole-grain cereals are more laxative in their effect than the refined variety, and whether these should be taken as mushes, gruels, bread, or oven toast, depends upon the individual.

### Too Much Cereal

It should be remembered that a preponderance of any cereal in the diet tends to constipation because of an excess of concentrated food, and that the lighter dextrinized cereals move with greater ease through the digestive canal. It is also important to know that in cases of irritable contracted bowel, whether simply the catarrhal stage of chronic constipation or the more extreme condition known as *mucous colitis*, gruels, because of their bland, demulcent action, are much to be preferred to mushes. Gruels should always be eaten slowly, preferably with hard toast. Prunes, dates, and figs have a mild laxative action.

It is needless to say that tea, coffee, condiments, and spices should be avoided.

#### Respiration Troubles

A tendency to catarrh, frequent colds, bronchitis, etc., in both old and young, may be greatly relieved if not entirely cured, by careful attention to the diet as outlined for the auto-intoxication type of individual. Vitamines and other necessary food elements being freely supplied, excess of fats and sugars being eliminated, and constipation being overcome, the individual will often be surprised at the marked relief from annoying symptoms referable to the respiratory as well as to the digestive tract.

#### Skin Affections

While many factors enter into the cause of *skin affections*, yet the one afflicted with *eczema, acne, boils,* etc., will do well to include as a part of his treatment, attention to his diet, with special reference to suggestions as outlined above. The elimination, for a time at least, of all free fat, as butter, oils, etc., with the minimum amount of cream, will often have a most beneficial ef-

fect, especially if, at the same time, an abundance of vitamine foods is supplied, and protein is taken in the form least liable to cause intestinal putrefaction, as boiled milk, buttermilk, or cottage cheese.

### Other Toxic Diseases

There may be placed in this class, as extreme results of auto-intoxication, or intestinal toxemia, such diseases as *pernicious anemia,* and the toxic form of *arthritis deformans,* a chronic disease of the joints, causing great deformity. There is much to make it seem that these conditions have, to an extent at least, their foundation in absorption of poisons from the intestinal tract, and their dietetic treatment should be carried out along the lines already suggested for the auto-intoxication type. The great point is to prevent intestinal putrefaction and at the same time to nourish the patient.

In order to prevent putrefactive processes, it may be necessary to restrict the diet to the minimum necessary to maintain the patient, at the same time pushing the vitamine content of the food. Here fruit juices and vegetable broths, spinach broth, etc., have their greatest efficacy and should be used freely. As an initial treatment, a diet limited for a few days to vegetable broths and fruit juices given at intervals of one to two hours, will work like magic in some cases. It is usually important to omit animal protein from the diet, except that as given in boiled milk, buttermilk, or cottage cheese.

In *exophthalmic goiter,* a disease not well understood, but one in which the thyroid gland, with its tonic effect on the nervous system, seems to work overtime, thus producing abnormal stimulation, with rapid heart, tremor, often diarrhea, etc., the question of feeding resolves itself into one of a diet that furnishes an ample

amount of vitamines and salts, with necessary amount of protein, but at the same time includes nothing which could, in any way, because of errors in digestion or metabolism, contribute to the irritable state of the thyroid gland. Whether or not there be, in any individual case, direct connection between the diet and this disease, every effort should be made to let the dietary part of the daily program be conducive to the highest type of body existence and equilibrium.

Experience tells us that, many times, intestinal conditions are at least one factor in the production of thyroid irritation, and often an accompanying diarrhea denotes a participation of the alimentary tract in the general instability. Therefore, no added or undue strain should be placed upon the digestion. Intestinal putrefaction should be assiduously avoided even, if necessary, to the prohibition of all animal protein and the simplicity of an antitoxic diet rich in vitamine-containing foods.

The individual will need to eat according to his type, whether that just considered above or the one outlined below. If he is of the auto-intoxication type, as he often is, he must eat to overcome his digestive shortcomings. If of the suboxidation type, to increase his oxidation processes. Digestive abnormalities and metabolic disturbances should be corrected by dietetic treatment, as outlined in this chapter, in so far as this is possible. Many times on the proper dietetic régime the results are very gratifying, and often helpful, in obtaining desired effects from other therapeutic measures.

Exophthalmic goiter may be taken as a type of a class of diseases apparently due to a disturbance in the endocrine balance, i. e., the mechanism, whereby, as the result of a harmonious interaction of the ductless glands (the thyroid, suprarenals, ovaries, etc.) the sympathetic

nervous system is controlled in all its activities. In all conditions of this class, dietetic treatment may be a help in tending to correct associated digestive and metabolic disturbances, whether causal or resultant, that if left uncorrected might stand in the way of the patient's satisfactory progress and ultimate recovery.

## The Second Type

The *suboxidation* type of person has no trouble with digestion. For that reason he has not the disturbing symptoms of the dyspeptic to place a check upon his gastronomic indulgences, and the results of his dietetic errors are often not felt till long after the harm has been done. In this class come those conditions due to accumulated wastes in the blood and the tissues because of imperfect metabolism and elimination (see Chapter IV) ; for example, gout, rheumatism, so called, high blood pressure, hardening of the arteries, obesity, fatty heart, and Bright's disease. These persons have a good appetite, can eat anything, are usually fond of sweets, butter, rich foods, etc., and see no connection between their symptoms and their dietetic habits.

These individuals need, with all others, the dietary essentials; they need, first of all, *vitamines* to stimulate processes of metabolism and oxidation. They need *mineral salts* to increase the alkalinity of the blood; they need *protein* to make muscle, for the excess of tissue that they often have is not muscle, but fat, and the muscle that they do have is not of a good quality.

### To Reduce in Weight

To decrease the protein part of their dietary much below normal limits is a mistake, but of total calories they can well bear a marked reduction with only benefit. Their tissues are so often clogged with uneliminated wastes that a low ration for a time is very necessary

for the best results, but this decrease should be in carbohydrates and fats, not to any extent in protein, unless, of course, the protein intake has been excessive. If overweight, they can use to good advantage the energy food already stored in their own tissues as fat. In this way the system may free itself from the handicap of excess tissue and burn up to better advantage other accumulated wastes.

These patients, with all others, need fruits and fruit juices, but when seeking to reduce in calories for the purpose of losing in weight, the vegetable juices and broths may be used more freely, and the fruits that are not so high in caloric value. The juice of a lemon twice daily in water, or a grapefruit, or an orange or two for breakfast, may be sufficient, if vegetable broths are taken freely as well as green and leafy vegetables. Tomatoes are of especial value in these cases, because, while their vitamine content is high and they are rich in alkalizing salts, they are low in calories. The acidity of the tomato seems to stabilize the vitamine so that it is not destroyed even in the process of canning. It has been shown that canned tomatoes can be made, in a great measure, to take the place of orange juice.

### Low in Caloric Value

Lettuce, celery, cauliflower, cabbage, raw or cooked, raw carrots, string beans, asparagus, spinach, and other greens should be used freely. Turnips are also good, in that they are low in caloric value. All vegetables should be cooked down in their own broth and served without fatty seasoning. Protein can be supplied, without furnishing an excess of calories, in the form of skim milk, buttermilk, cottage cheese, or an egg or two daily.

### How Many Calories?

The last question is, How many calories does the patient need? If his weight is normal, he needs simply

enough to maintain that weight, and *no more.* He should watch the scales until he loses, say half a pound. Then it is evident that the margin is reached, and it will be a simple matter for him to make the slight caloric adjustment to prevent greater loss. But if the loss of a few pounds is desirable, his daily calories can be lessened accordingly, perhaps 200 or 300 calories a day less than necessary for maintenance, with practically no discomfort, providing his proteins, vitamines, and salts are sufficient. After a time his ration may be increased, but he should avoid putting on flesh that he does not need. Because of the concentration of sugar, fats, and pastries, he will find it necessary to deny himself largely of these. The olives, nuts, dates, and cream, etc., allowed the thin individual cannot, of course, be added ordinarily to the diet list of the one who is overweight. Increased strength, vigor, and happiness, as well, will be his reward for abstemiousness. (See page 31.)

### To Reduce Blood Pressure

On the above régime it has become, in the author's experience, a very easy matter, not only to reduce in a most satisfactory way the weight of obese individuals, but also, in conditions of high blood pressure, to lower the blood pressure 30 to 60 points in often as short a period as ten days. In this way, a sphygmomanometer reading may be changed from 200 or more to 160 or below; and invariably there has accompanied the loss of weight, or the relief from excessive arterial pressure, a marked relief from other symptoms, with an added sense of well-being on the patient's part. Exceptions to the above would be cases with a marked degree of arteriosclerosis or kidney involvement. However, even these show decided benefit.

In the dietetic treatment of *heart and kidney disease,* the principles are the same, modified in these conditions

by the consequently weakened state of the digestive organs. In these cases it is necessary for us to go back to our principles of feeding in acute illnesses, giving all the food essentials in the most easily digested form, lessening the number of calories, because of the enforced inactivity of the patient.

### Salt-free Diet

It is particularly necessary in *kidney disease* to avoid all condiments, even salt except in very moderate amounts, because of the irritating effect upon the kidneys in the process of their elimination. A salt-free diet has long been recognized as the logical part of the treatment of Bright's disease. Recent literature on the subject, questions the necessity for such absolute restriction, but all are agreed that the amount of salt ingested should be limited to body need, which, according to Sherman, would be about one fourth the amount usually taken. We are reminded by this of the importance of a normal diet both in the prevention and in the cure of disease, and the diet most surely curative in any disease is the one that most completely supplies body need with the least strain on those tissues already weakened by digestive and metabolic shortenings.

### Diabetes

Diabetes is a chronic constitutional disease, due to the inability of the tissue to metabolize carbohydrates. For convenience, it may be classed with those of the suboxidation type. In it there is a condition of defective analysis of the carbohydrate part of the food. (See Chapter IV.) The tissues are unable for some reason to oxidize sugar. Therefore, the blood, not being able to utilize the ingested carbohydrate, treats it as a foreign substance, and as such, eliminates it in the urine. The disease is not one of the kidneys, but is one of metabo-

lism. If the blood is unable to metabolize and to use carbohydrates, there can be no possible advantage in eating them, as food not used by the body only imposes a burden and thus does harm.

### Eat Only That Which the Body Can Use

What purpose do carbohydrates serve in the diet? Principally that of supplying calories in an easily oxidized form; they supply neither vitamines, mineral salts, nor proteins, except as they are taken in combination with these. In feeding a diabetic patient, then, the principle is this: In the early treatment feed him vitamines, mineral salts, and proteins, unassociated as nearly as possible with carbohydrates. Supply calories in the form of protein or fat. As the patient's ability to metabolize carbohydrates improves under proper diet and care, add carefully small amounts of carbohydrates until an examination of the urine shows that they are not being utilized, but are being eliminated as sugar. Then withdraw carefully until sugar no longer appears in the urine.

### Fat as a Cause of Diabetic Acidosis

The great problem in feeding these patients is in supplying the necessary caloric food value, as, normally, the great bulk of calories is supplied by the carbohydrate part of the diet. The patient's chance of overcoming his disease lies in there being supplied to him freely his vitamines and mineral salts with necessary amount of protein food. To this there may be added a varying amount as regards caloric food value. His fat had better be supplied to him in a combined form, as in olives and nuts, rather than as an excess of free fats. The mistake has often been made of pushing the fats to too great an extent. This may easily overtax the body's ability to metabolize fats and cause an accu-

mulation in the blood of the products of incomplete fat metabolism, and is thought by some to be a factor in the causation of the state of lessened alkalinity so common with these patients and often referred to as diabetic acidosis.

Carbohydrate, as we have seen, is, under normal conditions, more easily oxidized than fat. Attention has already been called to the fact that carbohydrate has been likened to "the kindling," the combustion of which accelerates the oxidation of fat, the more concentrated fuel. When the normal utilization of the carbohydrate becomes impossible, great care must be taken that the body is not swamped with fat that it cannot metabolize. Less harm will be done, in many cases, by venturing, gradually, a little more carbohydrate in combination with vitamines, as in fruit juices; or in combination with complete proteins, as in boiled milk, than in too greatly pushing the fat, especially in its concentrated, uncombined form. To combat the tendency toward acidosis, a goodly supply of mineral salts may be given, and these best in leafy vegetables or their broths. These, as we know, also supply vitamines and complete proteins.

It is quite as necessary that the diabetic have furnished to him food essentials as it is that any other patient have them, and his recovery can never be hoped for unless his dietary program very soon allows him these foods. Very good results may often be obtained by placing the patient, for a few days, on a diet of vegetable broth. He should be put to bed and vegetable broths given him freely, say eight ounces every one or two hours. These may be prepared according to recipes in Chapter XXXI, and, preferably, they should be made from the leafy vegetables. He may take the water from spinach, cauliflower, or other leafy vegetable singly or

in combination. The urine in most cases will become sugar free in a few days; then other foods may be added. The additional foods should be those supplying the least amount of carbohydrate, but rich in the essential food elements.

### Noncarbohydrate Foods

The foods containing the smallest amount of carbohydrate are the leafy vegetables, as lettuce, spinach, greens of various kinds, asparagus, cabbage, Brussels sprouts, etc., also string beans, celery, artichokes, tomatoes, and cucumbers. Of the fruits, lemon, grapefruit, and olives are among the lowest. Those foods containing a little more carbohydrate, but still low, are turnips, carrots, squash, onions; the more acid fruits, as oranges, cranberries, gooseberries, etc.; nuts of various kinds, the Brazil nut, the pecan, and the filbert being slightly lower than the English walnut. After these, still higher in the scale are green peas, green Lima beans, parsnips, pears, apples, huckleberries, apricots, peaches, currants. Those highest in carbohydrate are potatoes, bread, cereals, legumes, macaroni, spaghetti, and sweet fruits, as prunes, bananas; also peanuts and chestnuts.

In the most severe cases the balance lies between the question of the patient's succumbing to inanition or a giving up of the attempt to make the urine sugar free. Some patients will stand a better chance of recovery on a fuller ration, even though sugar is not entirely eliminated from the urine.

The following menus are suggestive as to possible food combinations. To these, in many cases, may be added gradually a fuller ration, watching the urine for any evidence that the body is unable to utilize the added carbohydrates.

### Suggestive Menus for the Diabetic

| No. 1<br>BREAKFAST | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Whole Grapefruit (without sugar) | 7 | 89 | 100 |
| Soft Eggs (2) | 50 | .. | 150 |
| Almonds (6) | 15 | 3 | 100 |
| Per cent of protein for the meal, 21.<br>Per cent of carbohydrate for the meal, 27. | 72 | 92 | 350 |

Note that the per cent of protein is very high compared to the average per cent of the ordinary meal. (See page 163.) This may well be so, however, because of the very low total. The per cent of carbohydrate in the average meal is about 80 per cent, making it evident that the above percentage of 27 is very low. The *calories of fat are not given here;* if desired, they can easily be found by subtracting from the total the sum of the protein and carbohydrate calories.

10:30 A. M.

Vegetable Broth (8 oz.)

This vegetable broth may be made according to any recipes given in Chapter XXXI, except that any bean broth should be omitted.

| DINNER | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Tomato Gluten Soup | 23 | 74 | 103 |
| Lettuce Hearts with French Dressing | 3 | 6 | 50 |
| Asparagus (12 stalks) | 12 | 21 | 38 |
| Olives (8) | 8 | 16 | 160 |
| Egg Yolks (2) | 16 | .. | 100 |
| Per cent of protein for the meal, 11.<br>Per cent of carbohydrate for the meal, 25. | 62 | 117 | 451 |

4:00 P. M.

Vegetable Broth.

| SUPPER | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Vegetable Broth | 35 | 48 | 100 |
| Cottage Cheese with Cream | 50 | 16 | 160 |
| Olives (8) | 8 | 16 | 160 |

| | | | |
|---|---|---|---|
| Brazil Nuts (2) | 7 | 3 | 70 |
| Per cent of protein for the meal, 20. | 100 | 83 | 490 |
| Per cent of carbohydrate for the meal, 18. | | | |

BEDTIME

Vegetable Broth (8 oz.)

The total calories for the day, exclusive of the vegetable broth between meals, which in some cases may be omitted, equals 1,291 calories. The extra vegetable broth will give from 150 to 300 calories more, depending upon its preparation and the amount taken. This would make possible 1,591 calories, with 339 calories of protein. It supplies a large amount of vitamines and salts with the least amount of carbohydrate. In severe cases, even the amount of carbohydrate allowed in this daily ration might need to be decreased, which could be done by lessening those foods furnishing the largest proportion of carbohydrates. However, care should be taken that the vitamine foods are not greatly decreased.

| No. 2<br>BREAKFAST | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Fresh Tomatoes (2) | 14 | 48 | 66 |
| Scrambled Eggs (equivalent to 2 eggs) | 50 | .. | 175 |
| Walnuts (3) | 10 | 8 | 100 |
| Per cent of protein for the meal, 22. | 74 | 56 | 341 |
| Per cent of carbohydrate for the meal, 17. | | | |

| DINNER | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Vegetarian Consommé | 36 | 25 | 65 |
| Graham Zwieback (1 small slice) | 10 | 60 | 75 |
| Lettuce Hearts with French Dressing | 3 | 6 | 50 |
| String Beans (large serving) | 10 | 12 | 25 |
| Olives (8) | 8 | 16 | 160 |
| Per cent of protein for the meal, 18. | 67 | 119 | 375 |
| Per cent of carbohydrates for the meal, 36. | | | |

4: 00 P. M.

Vegetable Broth.

| SUPPER | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Vegetable Broth | 35 | 48 | 100 |
| Carrot and Cottage Cheese Salad | 69 | 21 | 170 |
| Olives (8) | 8 | 16 | 160 |
| Per cent of protein for the meal, 26. | 112 | 85 | 430 |
| Per cent of carbohydrate for the meal, 20. | | | |

In preparing the salad, use 2 heaping tablespoons cottage cheese, 1 heaping tablespoon carrots, and six almonds, then add a lemon dressing.

BEDTIME

Vegetable Broth.

The total calories for the three meals are 1,146. Extra vegetable broth may add 200 calories, making a total of 1,346 calories. Of this 323 are protein.

| No. 3 BREAKFAST | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Juice of a Grapefruit (without sugar) | 7 | 89 | 100 |
| Poached Egg on Toast | 39 | 80 | 200 |
| Olives (8) | 8 | 16 | 160 |
| Per cent of protein for the meal, 12. | 54 | 185 | 460 |
| Per cent of carbohydrate for the meal, 40. | | | |

Note how the toast increases the percentage of carbohydrate, making it evident why diabetics must use bread very sparingly.

| DINNER | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Tomato Gluten Soup | 23 | 74 | 103 |
| Gluten Biscuit (2) | 60 | 81 | 150 |
| Cottage Cheese Omelet (large serving) | 73 | 21 | 200 |
| Cauliflower | 6 | 4 | 12 |
| Brazil Nuts (3) | 10 | 4 | 100 |
| Per cent of protein for the meal, 32. | 172 | 184 | 565 |
| Per cent of carbohydrate for the meal, 32. | | | |

4:00 P. M.

Vegetable Broth.

| SUPPER | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Vegetable Broth | 35 | 48 | 100 |
| Lettuce and Almond Salad with French Dressing | 18 | 8 | 150 |
| Olives (8) | 8 | 16 | 160 |
| | 61 | 72 | 410 |

Per cent of protein for the meal, 15.
Per cent of carbohydrate for the meal, 18.

In preparing the salad, use with the lettuce hearts, 6 chopped almonds. Add French dressing.

BEDTIME

Vegetable Broth.

Total calories for the day, including all vegetable broth, are 1,635. Total protein calories equal 357.

### No. 4

| BREAKFAST | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Grapefruit with Almonds | 22 | 92 | 200 |
| Nut Tomato Toast | 36 | 129 | 205 |
| Olives (8) | 8 | 16 | 160 |
| | 66 | 237 | 565 |

Per cent of protein for the meal, 12.
Per cent of carbohydrate for the meal, 27.

Make toast according to the recipe 17.

| DINNER | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Vegetable Bouillon | 24 | 53 | 93 |
| Cottage Cheese with Cream | 50 | 16 | 160 |
| Spinach with Lemon | 8 | 11 | 25 |
| Apple and Celery Salad (with no dressing) | 5 | 53 | 60 |
| | 87 | 133 | 338 |

Per cent of protein for the meal, 26.
Per cent of carbohydrate for the meal, 39.

For the salad, use 1 medium-sized apple, 1 or 2 celery stalks. Dice the apple and chop the celery. Mix.

| SUPPER | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Vegetable Broth | 35 | 48 | 100 |
| Scrambled Eggs | 50 | .. | 175 |
| Lettuce with French Dressing | 3 | 6 | 50 |
| Olives (8) | 8 | 16 | 160 |
| | 96 | 70 | 485 |

Per cent of protein for the meal, 19.
Per cent of carbohydrate for the meal, 14.5.

This meal represents one especially low in carbohydrate.

BEDTIME

Vegetable Broth.

The total calories for the day equal 1,488. Total protein calories equal 284.

No. 5

| BREAKFAST | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Orange Juice (7 oz.) | 7 | 90 | 100 |
| Soft Eggs (2) | 50 | .. | 150 |
| Gluten Biscuit (2) | 60 | 81 | 150 |
| Per cent of protein for the meal, 29. | 117 | 171 | 400 |
| Per cent of carbohydrate for the meal, 43. | | | |

| DINNER | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Vegetarian Consommé (see recipe 37) | 36 | 25 | 65 |
| Baked Potato | 10 | 89 | 100 |
| Butter | .. | .. | 50 |
| Combination Salad with French Dressing | 7 | 24 | 85 |
| Olives (8) | 8 | 16 | 160 |
| Per cent of protein for the meal, 10. | 61 | 154 | 460 |
| Per cent of carbohydrate for the meal, 35. | | | |

In cases of diabetes of moderate severity, potatoes are allowable in limited quantities.

4: 00 P. M.

Vegetable Broth.

| SUPPER | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Vegetable Broth | 35 | 48 | 100 |
| Carrot and Cottage Cheese Salad | 69 | 21 | 170 |
| Olives (8) | 8 | 16 | 160 |
| Per cent of protein for the meal, 26. | 112 | 85 | 430 |
| Per cent of carbohydrate for the meal, 19. | | | |

BEDTIME

Vegetable Broth.

Total calories for the day, 1,490. Total protein calories, 360.

| No. 6<br>BREAKFAST | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Orange Juice (7 oz.) | 7 | 90 | 100 |
| Scrambled Eggs | 50 | .. | 175 |
| Baked Potato | 10 | 89 | 100 |
| Butter | .. | .. | 50 |
| Olives (8) | 8 | 16 | 160 |
| | 75 | 195 | 585 |

Per cent of protein for the meal, 13.
Per cent of carbohydrate for the meal, 33.

| DINNER | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Vegetable Broth | 35 | 48 | 100 |
| Cottage Cheese Omelet (large serving) | 73 | 21 | 200 |
| Beet Tops | 9 | 13 | 32 |
| Fresh Tomatoes | 14 | 48 | 66 |
| Walnuts (3) | 10 | 7 | 100 |
| | 141 | 137 | 498 |

Per cent of protein for the meal, 28.
Per cent of carbohydrate for the meal, 27.

4:00 P. M.

Vegetable Broth.

| SUPPER | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Vegetable Broth | 35 | 48 | 100 |
| Nut Tomato Toast | 36 | 129 | 205 |
| Grated Carrots (1 carrot) | 5 | 25 | 35 |
| Almonds (6) | 15 | 3 | 100 |
| | 91 | 205 | 440 |

Per cent of protein for the meal, 21.
Per cent of carbohydrate for the meal, 43.

BEDTIME

Vegetable Broth.

Total calories for the day, 1,723. Total protein calories, 377.

| No. 7<br>BREAKFAST | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Grapefruit | 7 | 89 | 100 |
| Milk Toast | 33 | 110 | 200 |
| Poached Egg | 25 | .. | 75 |
| Pecans (10) | 13 | 16 | 228 |
| | 78 | 215 | 603 |

Per cent of protein for the meal, 13.
Per cent of carbohydrate for the meal, 35.

| DINNER | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Tomato Bisque Soup | 14 | 48 | 75 |
| Gluten Biscuit (2) | 60 | 81 | 150 |
| Baked Potato | 10 | 89 | 100 |
| Butter | .. | .. | 50 |
| Cottage Cheese with Cream | 50 | 16 | 160 |
| Cauliflower | 6 | 4 | 12 |
| Olives (8) | 8 | 16 | 160 |
| Per cent of protein for the meal, 21. | 148 | 254 | 707 |

Per cent of carbohydrate for the meal, 34.5.

4:00 P. M.

Vegetable Broth.

| SUPPER | Protein Calories | Carbohydrate Calories | Total Calories |
|---|---|---|---|
| Vegetable Bouillon (see recipe 23) | 24 | 53 | 93 |
| Graham Zwieback (1) | 14 | 80 | 100 |
| Grated Carrot | 5 | 25 | 35 |
| Olives (8) | 8 | 16 | 160 |
| Per cent of protein for the meal, 14. | 51 | 174 | 388 |

Per cent of carbohydrate for the meal, 45.

BEDTIME

Vegetable Broth.

Total calories for the day, 1,898. Total protein for the day, 347.

Many cases of diabetes do not need to be so greatly restricted in their diet; others need even greater restriction for a time at least. During the initial period of treatment, it may be necessary to so completely eliminate the carbohydrate from their diet that their total calories may be 1,000 or below. Their chance for recovery, however, will usually depend upon its being possible to supply them necessary vitamines and salts. As has already been said, this may be most readily accomplished by restricting them entirely to vegetable broths. These vegetable broths should be made of leaves and skins, these supplying more vitamines, salts, and pro-

teins, with the least amount of carbohydrate. In these broths may be used potato skins, carrot skins, tomatoes, celery leaves, spinach, cabbage, and cauliflower, or any other vegetables of a leafy nature. The caloric value of the vegetable broths given above can only be approximate, as they may vary greatly, depending upon their mode of preparation and the kind of vegetables used. Try the following recipe:

4 potatoes (scrub well and peel)
2 carrots (scrub and peel)
2 onions (clean, but do not remove skins)
1 bunch of celery (remove tops)
4 tomatoes (do not peel)
1 bunch of spinach
1 small head of cabbage

Put together in a large kettle the potato and carrot skins, the onions, celery tops, tomatoes, spinach, and cabbage. Cover with cold water. Bring slowly to a boil. Cook for one-half hour, then place in a fireless cooker for three hours; or cook slowly on stove for two or three hours. Add water as necessary. Pour off the liquor, of which there should be about one quart; salt and serve. One-half pint of strained tomato may be used, if necessary, instead of fresh tomato.

# CHAPTER XXVII

## PRINCIPLES OF FEEDING THE SICK AS APPLIED IN CHRONIC INFECTIOUS DISEASES

Of chronic infectious diseases, we may take *tuberculosis* as a type. In this condition the vitality has been lowered to such an extent that the infecting agent, the tuberculosis germ, has successfully invaded the tissues, and has, to a greater or less degree, got the upper hand. The body resources are not sufficiently strong to quell the invader. In some cases, the infection may lie dormant, not making much headway. In others, the body forces are constantly losing, and the patient finally succumbs.

### Due to Impoverished Diet

Many of these patients are improperly nourished to begin with. In fact, it has been said that tuberculosis is indirectly due to an impoverished or a deficient diet, or, in other words, that because of a lack of proper nourishment the system becomes so depleted that it falls an easy prey to infection. So, to nourish these individuals properly is of first importance, and gives them a fighting chance.

There is an imperative need for large quantities of vitamines, with their favorable influence on all vital processes. There is increased demand for alkaline salts to counteract the increasing tendency toward acidity ever present in chronic infections. Some say that there is need for extra calcium salts, due to the fact that the healing process is dependent upon a walling off, with calcification, of local diseased areas. There is a great necessity for added protein because of increased tissue

waste. How to supply these in a form easily used by the system, is the great question.

### Low-Grade Fever

Many of these are cases of long-continued fever of low-grade type. Such are bed patients, and must be fed often, as in any prolonged fever case (see Chapter XXV), pushing the vitamines and salts; keeping the amount of protein up to the amount well tolerated; and increasing the caloric total gradually as the patient can bear it.

All of these, whether running a temperature or not, have more or less toxemia, and the outline for feeding must be much the same as for those of the auto-intoxication type. (See Chapter XXVI.)

### Digestive Disturbances

Almost without exception, patients with tuberculosis have depressed digestive function, their first symptoms often being those of dyspepsia. There should therefore be served to them food that while supplying needed nourishment, can get from the alimentary tract into the blood with as little strain as possible on the digestive organs. Each individual case must be studied as to personal tastes and digestive shortcomings; foods must always be given with due regard for digestive ability, and should not be pushed beyond the point where the patient can well take care of them.

### Forced Feeding

Because of the great need of protein, the plan of "forced feeding," with a large amount of milk and eggs, so in favor a few years ago, did good in many cases. This furnished an abundance of protein as well as vitamines and salts. But the large amount of milk and eggs often greatly increased the toxemia, thus, many times, overbalancing the good which might have

been derived from the high protein diet. Therefore, whenever possible, the diet should be planned in such a way as to furnish needed nourishment without encouraging intestinal putrefactive processes.

As to feeding possibilities, we give the following outline, which will need modification in many ways for different cases.

### To Supply Vitamines

To supply vitamines, fruit juices and vegetable broths should be given freely at meals and between meals. For example, the patient might have a glass of fruit juice one hour or one-half hour before each meal and a cup of vegetable bouillon at the beginning of each meal. If this seems too much liquid, the broth may be made more concentrated and only one-half cup taken at a time. Or the vegetable broth may be taken between meals, say two hours before meals. McKann's recipe for vegetable soup is a good one. It is as follows: Boil cabbage, carrots, celery, parsnips, spinach, onions, and turnips together for two hours; drain off the liquor, and discard the residue; feed the liquor as soup in generous quantities. Other vegetables, of course, may be used (see recipes, Chapter XXXI). In this way these patients may get an abundance of vitamines and mineral salts as well as from 300 to 500 calories of actual food value, aside from that which they would get anyway in their regular meals.

### Milk and Eggs

As large an amount of milk as can well be taken, affords a valuable means of protein supply, and here it is of great advantage to remember that boiled milk can be taken in larger quantities than raw milk, because it is so much more easily digested (see page 224). So this patient may well have at least a quart of milk a day to

drink, in addition to that cooked and served with his food. This milk should be *eaten;* that is, sipped alternately with other food, instead of being drunk. Ordinarily it is better to take milk only at mealtime, the only food taken between meals being fruit juices and vegetable broth. In addition to this, cottage cheese may be served to him in various ways (see recipes 48 and 77). He may take buttermilk with or without the addition of cream. Two eggs daily may be of value in adding necessary extra protein, and may in some cases take the place of so much milk. If able to take all of the above foods, he may easily get protein as follows: Milk, one and one-half quarts, protein calories, 180; two eggs, protein calories, 50; cottage cheese, 2 heaping tablespoons, protein calories, 60; total protein calories, 290. In addition to this, the protein of his cereals, vegetables, and other foods, including perhaps a dozen almonds daily, would easily bring his protein up to 350 or 400 calories daily. This excess of protein, however, would be necessary only in those cases where, because of wasting, there is need of extra tissue building, and should, of course, be adjusted to suit the patient. Grains, vegetables, and fruits should be used freely,— cereals preferably in the form of dextrinized cereals and as gruels.

## Total Calories

The total amount of food required depends upon the degree of emaciation of the patient, but, unfortunately, the emaciated patient is the one who often cannot digest his food. Such patients may need to be limited largely to a liquid diet, with frequent meals consisting of fruit juices, vegetable broths or soups, and boiled milk with perhaps oven toast, other simple foods being added gradually. For those patients who can take more of the solid food, the daily calories may be increased in various ways; e. g., olives at each meal, perhaps six, thus

in the three meals adding 300 calories to the daily total; two or four dates at the end of each meal, making 100 to 200 more; three or four walnuts daily, adding another 100; a little additional cream, if patient takes it well. It must not be forgotten that in all infections, whether acute or chronic, an excess of free fat should be avoided. Fats are better derived from olives and milk than from butter or a large amount of cream.

## Do Not Overfeed

It cannot be too emphatically asserted that food beyond what the digestive organs can handle only does harm; that it is the food digested, not the food eaten, that nourishes the body. It may be better, in many cases, to lessen the total amount by half and have it digested and utilized than to push the amount to some desired total and produce fatal results, because of indigestion and increased toxemia. There are few cases that cannot be supplied sufficient vitamines, salts, and protein by following the principles already laid down. But to overfeed is a great mistake and should be avoided. When the total calories must of necessity be low, by all possible means keep the protein relatively high; lessen the amount of the more purely energy foods and limit the patient's activities in accordance with caloric intake.

## Milk Diet

In many cases of tuberculosis the milk diet may be carried out with success and much benefit to the patient. (See milk diet, Chapter XXVIII.) However, the same results can usually be obtained by an intelligent combination of other foods, supplying in a less monotonous form the valuable food elements furnished by milk.

In all chronic infections that might be mentioned, the basis of feeding is the same. Push the vitamines and

properly nourish the individual. First, be sure of sufficient protein, then add energy food as indicated. Avoid intestinal stagnation and putrefaction by boiling the milk, which not only aids in its digestion, but also sterilizes it; by using the lactic-acid products, as buttermilk and cottage cheese; and by using only eggs which are strictly fresh and from well-kept hens.

In *pyorrhea* the thing of first importance, together with necessary dental work, is to change the basic or constitutional condition by a well-balanced diet, including an abundance of fresh fruit and green vegetables. And in all chronic infections, no matter what the germ, the importance of general hygienic measures to increase the vital resistance of the patient cannot be too strongly emphasized. Of this general hygiene the dietetic treatment is ever of great importance, and should be carried out as outlined above. This insures the best results from any other treatment or necessary medication.

> *"The lack of defensive essence is just as potent a producer of disease as the presence of an invading toxin. I am, indeed, here to carry this argument a step farther by declaring that all disease — or nearly all — depends not so much upon the presence of a plus as upon the absence of the minus; to contend that were it not for the poverty of the soil in defensive essence, the weeds of disease would never grow." — Williams, at meeting of British Medical Association, July, 1920.*

# CHAPTER XXVIII

## MILK AND THE MILK DIET

### A Complete Food

Milk is a very valuable food, and forms a large part of the diet of civilized races. For this reason, a thorough knowledge of milk, its food value, its digestion and utilization in the body, and the best ways of using it in the diet, is of great importance. Milk as a food is more nearly complete than any other. It contains all the known vitamines, water-soluble B, fat-soluble A, and water-soluble C. It contains mineral salts, being slightly deficient in iron, because of the fact that the young animal, for whom milk is intended, is born with a good supply of iron stored up in its body. It contains complete protein in large proportions, 100 calories of milk giving 19 or 20 calories of protein. It contains a large amount of fat, 50 per cent of its food value being this concentrated food element. It contains carbohydrate in the form of milk sugar, about 30 per cent of its food value being in the milk sugar which it contains. It contains a large amount of water, 87 per cent of its volume being water. Containing no cellulose, it does not have the laxative action due to this substance. For this reason, a milk diet may be considered nonlaxative, or constipating, in its mechanical effect on the bowel. But it contains all the food elements which must be absorbed in order to sustain life.

### A Disadvantage

Its disadvantages as a sole article of food are due largely to its lack of cellulose to stimulate the bowel to normal action, and to the fact that it is more or less

subject to putrefaction in the germ-laden intestinal tract. If retained long in the bowel, such putrefactive products are harmful to the system.

### A Solid Food

Because of the acidity of the gastric juice, and the milk-curdling action of one of its ingredients,— the rennet ferment,— milk begins to form curds soon after it enters the stomach. Thus it forms in the stomach a substance of more or less solid and tough consistency instead of the simple liquid it might at first seem to be. This solid portion of the milk is its protein, and in this solid form it is digested by the pepsin of the gastric juice. The fat and sugar are digested later in the intestine.

The ease of milk digestion depends upon the size of the curds. It has been found, as the result of a series of experiments, that the curds formed by the milk tend to coalesce, so that even if milk is taken in sips, large curds may be formed unless the sips of milk are alternated with bites of other food, and the milk is more or less mixed with other food before it is swallowed. (See page 175.) If for any reason milk digestion is delayed, it may also greatly delay the digestion of other food, and as it passes into the intestine it, with the food accompanying it, may be in a condition in which, in the presence of the germ activity of the intestinal tract, putrefaction very rapidly takes place. A stagnant condition often results, with indigestion, distress, fermentation, and gas formation. Poisons may be formed that overwhelm the liver, get by into the blood stream, and tend to produce ill health. For this reason, *in what form and how* milk is taken, is of great importance.

There are many ways in which milk can be used as a food. Let those who usually find that milk does not agree with them, try one or more of the following:

1. *Buttermilk,* because of its lactic-acid content, does not favor intestinal putrefaction, as does sweet milk, because the germ producing lactic acid, is antagonistic to the germs of putrefaction. It supplies the same food value as milk, except the fat content. This lack, however, for some people simply facilitates the ease of digestion, but if the food value of whole milk is desired, it is a simple matter to accomplish this result by the addition of about two tablespoonfuls, or an ounce, of average cream to a glass (seven ounces) of buttermilk.

Many people attempting to use buttermilk complain that it causes flatulence. This to a large extent may be obviated by eating the buttermilk with a spoon, mixing it in the mouth with other food, instead of drinking it, as is usually done. Other lactic-acid products of milk, as yogurt, fermilac, vitalait, etc., are good also and may be substituted for buttermilk.

2. *Cottage cheese.* Very few people cannot take cottage cheese. Like buttermilk, it does not favor intestinal putrefaction. It is a solid food instead of a liquid, and so does not introduce into the stomach an excess of liquid, which for some is an advantage. (See page 177.) It supplies a large amount of complete protein, which is often needed by the very class of people who do not seem able to take milk. It may be served plain or made equivalent to whole milk by the addition of cream. It may be combined in recipes to give variety (see recipes 48 and 77). Neufchâtel cheese is a lactic-acid cheese which can be obtained on the market, and, if fresh, is good. Milk curdled by the use of the junket tablet is in a form that can be masticated and therefore digested with ease.

3. *Boiled Milk.* As has already been suggested in previous chapters (see page 224), it has been demonstrated that boiled milk is much more easily digested

than whole milk, because of the fine, flaky curds that are formed. These are much more easily surrounded and permeated by the gastric juice than are the large, tough curds of raw milk. The boiling of milk also sterilizes it, and if it is taken soon after boiling, having been kept free from recontamination, it enters the digestive tract a sterile substance. Being easy of digestion, it passes quickly through the stomach and bowel, and is much less liable to intestinal putrefaction than that form of milk which is germ laden when it is taken, and because of its large curds, passes slowly through the alimentary canal. Boiled milk has always been considered constipating, but milk, even though raw, has nothing to recommend it as a laxative food, for it contains no laxative ingredient, as cellulose. After its water is absorbed, it leaves a concentrated residue, which, as we have seen, does not favor natural bowel activity. When unboiled, there is a greater residue, because of the large curds, but this favors, if anything, the irritation of putrefaction rather than the normal stimulus for peristalsis. The helpfulness of boiled milk in diarrhea is due to the fact that, because of its ease of digestion and absorption, it has a soothing, nonirritating action which tends to overcome the irritated condition practically always present in diarrhea.

Fresh milk, boiled and taken soon after boiling, is probably not to any great extent deprived of its vitamines, but a diet including a normal amount of fruit and vegetables is not dependent on milk for its vitamine content, so the question of devitalizing milk by boiling is of minor consequence. *Milk should always be used fresh.* Boiling should never be depended upon to make it possible to use old or stale milk.

4. *Skim milk.* For some who find milk fat difficult of digestion, the protein of milk may be utilized in the

form of skim milk. As a rule, for these the milk should be boiled. Boiled skim milk is one of the very simplest of foods, and can be taken by any one who can take liquid of any kind. It often solves the feeding problem.

5. *Whole raw milk.* This, if certified as to its purity, can be taken by many with advantage. As a rule, it is well to take it mixed with other food, as, e. g., bread and milk, or on cereal, or alternating sips of milk with solid food. Taken in this way, large curds are not so likely to be formed.

In the author's opinion it is never wise to drink milk between meals or at bedtime, as is often done, except of course, as is necessary in the frequent feedings of a liquid diet. In such cases the feedings, even though as often as every hour, may be considered meals, and our rule as to milk "between meals" still holds good.

6. There are other and varied ways in which milk may be used with advantage, as in soups, sauces, and other cooked dishes. In this form many can take milk well who seem unable to take it in any other way.

## The Milk Diet

Because the milk diet has been accorded such a following and has been heralded abroad as a cure-all for so many conditions of ill health, and is, in many cases, an important means of supplying to undernourished individuals essential food elements in an easily assimilated form, we believe a discussion of the milk diet at this time will not be out of place.

The milk diet supplies to the one taking it a goodly amount of protein, 120 calories to the quart, with total calories of 640 to the quart. It also contains mineral salts and vitamines. By taking milk as the sole article of diet, so that there is only one kind of food to tax the digestive organs, the patient with poor appetite and

weak digestion is able to take and assimilate more calories than in any other way. Four quarts daily of milk, the least amount that is usually considered sufficient when one is on a milk diet, supplies a total number of calories equaling 2,600, with 480 calories of protein. This excess of protein is what these patients often need, and if for a time more can be taken, it thus increases the value of the milk diet and the patients are usually gratified by a marked and definite gain in weight. This gain in weight often gives them just the reserve they need.

In many cases the advantages of the milk diet may be derived in a less monotonous way by following the suggestions given in Chapter XXVI for cases of the auto-intoxication type. But there are times in which the definite initial start obtainable from a diet restricted to milk is of great advantage. Many an individual will accept with resignation the restrictions of the milk diet for a few weeks, who lacks the faith to adhere to any other plan. It becomes an easy matter then, after the initial benefit has been received, to accomplish the change back to a normal diet, following the plan of Chapter XXVI.

However, when it seems that the milk diet is indicated, the fact that milk is easy to digest may be used to great advantage, making it possible for those to take the milk diet who have perhaps been ruled out as unsuitable subjects, those who have never seemed able to take milk in any form; and it greatly increases the advantage that any may derive from this diet.

### A Safety Measure

But, again the question arises: How about the constipating action of boiled milk and its vitamine content? First, as has been said, the milk diet may always be

considered constipating, even though the milk is taken raw. Artificial means must always, to a greater or less extent, be used to induce necessary bowel activity, and if milk is boiled, the vitamine supply must be secured from another source, this other source being always a great advantage from several standpoints, and very helpful in combating constipation. Fruit juice, which is the added source of vitamine suggested, makes a very valuable and satisfactory addition to the milk diet. Just as we add orange juice to the diet of a baby who is on boiled milk, so we give the adult, when on the milk diet, fruit juices, including orange juice. A suggestive program for the milk diet, found in the author's practice to be very satisfactory, is as follows:

| | | |
|---|---|---|
| 7 A. M. | Fruit juice | 8 to 12 oz. Preferably orange juice or watermelon juice. In some cases a breakfast of fruit itself has been allowed. |
| 8 A. M. | Boiled milk | 8 oz. |
| 9 " " | " " | 8 " |
| 10 " " | " " | 8 " |
| 11 " " | " " | 8 " |
| 12 M. | " " | 8 " |
| 1 P. M. | Fruit juice | 8 to 12 oz. |
| 2 " " | Boiled milk | 8 oz. |
| 3 " " | " " | 8 " |
| 4 " " | " " | 8 " |
| 5 " " | " " | 8 " |
| 6 " " | " " | 8 " |
| 7 " " | " " | 8 " |
| 8 " " | " " | 8 " |
| 9 " " | Fruit juice | 8 to 12 oz. |

On this program the patient begins the milk diet with three quarts of milk and three fourths to one quart of fruit juice daily, making a total of about 2,300 calories. Gradually increasing the milk to 12 ounces every hour, brings the daily milk ration up to four and a half quarts and increases the total calories to 3,000 or more. Dur-

ing the day, when the appetite becomes cloyed with so much milk, there may be substituted at any time for the hourly milk ration another glass of fruit juice, or a glass of buttermilk.

The attendant constipation usually necessitates daily enemas, and bowel activity is favored by preceding the morning fruit juice by a cup of flaxseed tea made from the whole seed, then strained, and taken hot with lemon juice.

Some cases are able to take more milk than suggested above, even as much as five or six quarts daily, but we have found it no great advantage to push the milk beyond what the patient can take with comparative ease. Some patients can take more milk if a portion of the cream is removed, but there is, of course, little advantage in this because of the lessening in the caloric value.

*"Oh, for festal dainties spread*
*Like my bowl of milk and bread;*
*Pewter spoon and bowl of wood,*
*On the doorstone, gray and rude!"*

# CHAPTER XXIX

## FOOD IDIOSYNCRASIES

### Principles Versus Rules

No two individuals can eat the same foods. No two need the same diet, either in kind or amount. Rules in dietetics are ever misleading. Principles need individual application, and what is good for one person may not necessarily be best for another. Dietetic needs vary with individual digestive ability and metabolic activity.

Certain classes of foods are more easily utilized by some people than others. Some can digest greater bulk of food or coarser cellulose; some can handle a greater amount of fat; some do not take a large amount of starch or sugar well; some need and can utilize more protein; others may need to keep protein food within narrow limits.

All of these individual peculiarities should be recognized and the daily ration planned accordingly. At the same time natural food resources are so varied and unlimited that none need lack a complete and well-balanced food supply.

Habits of eating, food likes and dislikes, and even, to an extent, the apparent ability of the digestive organs to care for food, are to a great degree the result of education. Dietetic habits formed in childhood and early youth usually prevail in later life, the individual often being very persistent in the thought that any radical change in his ways of eating would be out of the question.

### A Change in Mental Attitude

It is very possible, however, for any individual to learn to enjoy new foods, new combinations, and even

to lose his relish for foods of which he was at one time very fond, providing there be a sufficient incentive or chain of circumstances to give him a willing mind, or to change his mental attitude. Many have come to have a dislike for some food formerly enjoyed, through some circumstance connected with the eating of it. There are many who can testify to a great change in their habits of eating as a result of the food conservation campaign of the late war. Interested in the food questions of the day, they looked at foods and the question of eating in a new light, and their mental attitude became such that it was comparatively easy for them to make even quite radical changes in their food preferences. They *wanted* to like certain things and found it easy to do so. Many now enjoy Graham and whole-wheat bread who, before the war, countenanced only white.

### New Interests

Travelers in the Orient, as they become interested in the customs of the people, often find it quite possible to partake of and to enjoy foods which at home they would never choose. Their interest changes their mental attitude to one of willingness to try something new in the food line. Likewise, an individual thoroughly interested in his own physical welfare and learning that a change in diet would be beneficial, can, if he will, right-about-face, dietetically, and learn to eat with the keenest enjoyment those things which before contained no appeal for him; that is, provided he is sufficiently and properly nourished thereby.

A food idiosyncrasy is a condition in which a certain food, ordinarily a good food and well borne by people in general, cannot be eaten without producing disturbing symptoms, even to the extent of poisoning, real or apparent.

Real food idiosyncrasies are comparatively rare and will be discussed later.

*Fancied food idiosyncrasies* are frequent, and we often hear people saying that they cannot eat oranges, take orange juice or fruit of any kind, when, if they could only be made to *think* so, by a little planning and intelligent application of feeding principles they might find themselves well able to take fruit. There are many who insist that milk, in any form, produces indigestion; when the trouble is not with the milk but in the way it is eaten.

One dear little lady, after eating for days a combination that would be a tax on any one's liver, when she came down with a bilious attack, remembered that she had eaten an egg the day before, and wailed, " I never *could* eat eggs."

A sufferer from asthma happened to have an asthmatic attack following a meal in which an innocent grapefruit was included. Never again could she be induced to eat grapefruit. As the grapefruit was only one of many foods taken at this meal, just why it should be blamed was difficult to determine. One patient, who insisted that beans were " poison " to her and who never failed to suffer the expected symptoms upon the ingestion of even a recognized bean flavor, took them without the slightest untoward result when bean purée was served her in a vegetable soup in which the bean flavor was masked. No doubt for her the bean cellulose was difficult of digestion, but she failed to recognize the cause of the trouble and blamed it to some inherent quality of the bean itself, the fallacy of which in her case was quite evident.

### Afraid to Eat

There is no phase of life in which the mental attitude has such a bearing as in the question of eating. Some

individuals have this mental anxiety toward food developed to such a degree that all food causes indigestion for no other reason than that it is expected to make trouble. Many are deprived of necessary food elements and die of malnutrition and deficiency diseases, because they are afraid to eat.

One cannot live unless he eats to live, and in order for the system to carry on its activities the diet must include all food essentials. The depleted system of the one who does not eat cannot, because of weakness, properly digest any food, and thus a vicious circle is established which must be broken through at some point. The only hopeful point is that which offers opportunity for the system to receive its necessary nourishment, no matter what may be the remonstrance of a weakened, nervously warped digestive tract.

### Better Digestive Distress than Starvation

Vitamine and protein foods must be supplied freely, but these are often the ones that people of this type think they cannot take. Better some gas and distress for a time than death from starvation. A sensible plan of diet, outlined with due regard for digestive weakness, should be followed in spite of some consciousness of discomfort after eating.

What is often termed one's experience may be distorted by fear, prejudice, and even, to an extent, an unwillingness to yield a point. We give the following quotation as having an application to the subject in question:

" Real experience is a variety of careful experiments, made with the mind freed from prejudice, and uncontrolled by previously established opinions and habits. The results are marked with careful solicitude, and an anxious desire to learn, to improve, and to reform on

every habit that is not in harmony with physical and moral laws. The idea of others gainsaying what you have learned by experience, seems to you to be folly, and even cruelty itself. But there are more errors received and firmly retained from false ideas of experience than from any other cause, for the reason that what is generally termed experience is not experience at all; because there has never been a fair trial by actual experiment and thorough investigation, with a knowledge of the principle involved in the action."— *White.*

A *true food idiosyncrasy* is a hypersensitiveness of the body to certain proteins, resulting in the production of toxic symptoms whenever these proteins are taken. True food idiosyncrasies do occur, and they should be recognized.

As has been noted elsewhere (see Chapter VI), proteins differ greatly. Food proteins are different from body proteins. There is a great variation in tissue proteins of the same animal body and in the proteins of different plants and different animals. While the building stones that make up proteins in the beginning are from the same eighteen structural units, yet in their many combinations, the resulting proteins are as varied and numerous as the words of the English language.

## Foreign Proteins

All proteins not a part of the blood or tissues of any animal body, are foreign proteins as far as that animal is concerned, and remain so until the protein molecule is broken down and rebuilt into one partaking of the nature of those of the animal itself. This breaking down usually takes place in the digestive tract of the animal, and the protein is absorbed in the form of the elemental amino acids, which after absorption are reunited in various combinations to form the many different kinds of tissue.

### A Toxic Element

In the breaking down, or digestion, of the protein molecule a portion is set free which is toxic, but being eliminated in the digestive tract, is normally without effect. If for any reason the protein molecule is absorbed before proper digestion, it enters the blood stream as a *foreign protein.* There may be an effort on the part of the tissues to break it down with the elaboration of certain ferments for this purpose. If this digestion in the tissues is accomplished, the toxic element ordinarily set free in, and eliminated through, the digestive tract, is set free in the blood, with resultant toxic symptoms. The ferments, having once been elaborated for the tissue digestion of this particular protein, persist, and the body becomes *sensitized* to this protein, symptoms of poisoning ever resulting when it in any way reaches the blood stream. In catarrhal conditions of the digestive tract, with the ever attendant congestion of the mucous membrane often resulting in an abnormally increased absorptive power, proteins may be absorbed before disintegration, and, if the body attempts to digest them in the tissues, toxic symptoms may result.

### Anaphylaxis

This toxicity results only if, as a result of the above combination of conditions, the body becomes *sensitized* to this protein. This condition of abnormal *sensitization* is known by the name *anaphylaxis.* According to Rosenau anaphylaxis may be considered " a condition of unusual or exaggerated susceptibility of the organism to foreign proteins."

After sensitization once occurs, the hypersensitiveness is very extreme, so much so that a very small amount of the offending protein may cause trouble; not only if taken through the digestive tract in the form of some

food protein, but also, in some cases, the infinitesimal amount which might be absorbed through the respiratory mucous membrane, as in hay fever due to pollen sensitization, or in the attacks of asthma some people have when in close proximity to horses, and called "horse asthma." Certain drugs, by reason of their altering some of the body proteins, cause symptoms of anaphylaxis. Food proteins to which the body most often becomes sensitized are the animal proteins, as various meats, shellfish, eggs, milk, and occasionally, strawberries, gooseberries, etc.

Anaphylactic symptoms often show themselves in the skin as hives; in respiratory reactions, as hay fever, asthma; and in various digestive disturbances. These conditions of hypersensitiveness may be hereditary, or may be acquired in the way outlined above.

### Sensitization Tests

There are protein skin tests called *sensitization tests* that can be made to determine one's sensitiveness to certain proteins, and these should be made in all cases of suspected anaphylaxis. Where such a condition exists, the treatment consists in avoiding the offending protein; in selecting a careful diet designed to clear up any abnormal conditions of the digestive tract; and, in some cases, under competent supervision, the taking of graduated doses of the protein, with the hope that a tolerance for it may be established. If it chances to be the protein of oyster, clam, etc., it may not be worth while to bother with an attempt to establish body tolerance for it.

There are really very few, if any, natural foods properly prepared and properly eaten that will cause this condition of anaphylaxis. Very often the offending foods are those which might be questioned from other

standpoints than that of peculiar individual idiosyncrasy. Food idiosyncrasies not explainable along lines of rational principles of feeding are seldom met with and, in most cases, need cause little inconvenience if normal dietetic principles are applied in every case with necessary individual application.

"*An impoverished diet produces poverty of the blood. Cases of disease most difficult to cure result from this cause.*"—*White.*

# CHAPTER XXX

## SUMMARY AND CONCLUSION

1. Our bodies are made up of the food we eat. "As a man eateth, so is he." Quality of tissue depends on quality of food.

2. Food may be of poor quality when eaten, or it may become contaminated during a process of retarded digestion, and so be impure as it enters the blood.

3. Excessive quantity is sure to impair quality of food and of the food-laden blood.

4. Chronic disease is largely due to defective food analysis in the body. These conditions are all preventable. Knowledge is power.

5. Know food values, the composition of foods, and the relation of food elements to body needs.

6. See to it that your daily ration is a balanced one. Do not consider the question of calories an arbitrary one. Remember that individual needs and conditions must be considered and rules modified. Estimate your calories for two weeks. How much are you eating, and is it the right amount? Could you do just as well on less, or do you need more? Sit in judgment on your own case.

7. Remember that excessive calories cannot make up for deficient vitamines; that the body cannot utilize food unless the necessary physiological ferments are backed up by an ample vitamine supply. Know the vitamine foods and avoid a devitalized diet. Eat freely of raw foods, and do not forget the value of green vegetables.

8. Avoid a monotonous diet, and thus the danger of deficiency in quality as well as in quantity of proteins.

9. Do not consider it a hardship if you find it necessary from the standpoint of economy to limit your meat supply. Remember that an adequate, properly balanced diet is very possible without the use of flesh food, and that the fleshless diet offers many advantages healthwise.

10. Keep out of your food those things that make it "hot when it is cold" and that tend to produce irritated catarrhal conditions of the digestive mucous membrane. Remember that the mucous membrane may be irritated not only by condiments, but also by excessive and superheated fats, improperly masticated and indigestible food, and by cane sugar in concentration.

11. Do you long for a good complexion? Eat less free fat, more raw carrots, fresh fruit, and green vegetables.

12. Remember that your health and efficiency are impaired, your possibilities for length of life lessened, by the use of beverages and foods which continually, even though slightly, stimulate because of drug principles that they contain.

13. Remember that bread is the "staff of life" only when it contains its nutritive elements entire, and that the use of the whole grains is economy from every standpoint.

14. Regard desserts with suspicion, use them with caution, and when used, let them supply a need rather than serve as an excess.

15. A simple variety at a meal is a great advantage, and the best combination is a well-balanced ration.

16. No one dietetic plan is a "cure-all." All rules have their exceptions. The only safe plan is to have a thorough understanding of dietetics and of the principles of nutrition, with the use of common sense and good judgment in their application.

17. The physical foundation for mental and spiritual growth is most important. The greatest work that can

be accomplished is that of feeding the child in such a way as to insure the highest type of physical, mental, and spiritual development. The self-discipline and control that this will foster is not the least of the good results.

18. Conserve your food intelligently and thus your health. Economy is spending not less, but more wisely. Much that is expended for food could be used with better and far more lasting advantage in some other way.

19. Remember that good food may be wasted, or spoiled in the preparation, and that cooking should be a science as well as an art.

20. Remember that *how* you eat is quite as important as *what* you eat, if not more so. Food eaten properly is much less liable to be taken in excess. Proper and thorough mastication will cover a multitude of dietetic sins. If you must hurry, eat less.

21. Allow ample time for stomach digestion by sufficient rest between periods of work, so that this your faithful friend, upon the integrity of which so much depends, may not give out before its time.

22. System and regularity are as important in the work of the digestive tract as in any other business. Therefore, plan for regular habits of eating. Never eat between meals.

23. If fluid taken at meals hinders the proper mastication of your food, go on a dry diet.

24. Do not forget that adherence to principle in eating is an evidence of strength of character, and that he who eats to live will longer live to eat.

25. Above all, do not be a fanatic.

26. If you are sick, remember that your body requires the same food elements as in health, with a relative increase in vitamines, mineral salts, and complete proteins, and a relative decrease in bulk and in calories.

# CHAPTER XXXI

## RECIPES — SIMPLE, ECONOMICAL, HYGIENIC

THIS book is *not* a cookbook. But in order to help the housewife make practical application of the principles laid down in the preceding chapters, and to acquaint her in a measure with simple hygienic methods of cookery, we append a few representative recipes that we trust may serve to introduce her into the art and science of healthful food preparation.

To lend variety, many of these recipes may be modified. The housewife already versed in the art of cookery may often be able to improve upon the recipe given, but we trust that she may do so with intelligent regard for food values. The size of the serving may often vary, but the calories given for the entire recipe will enable any one easily to estimate the value of any sized helping. A few of the recipes have been received directly from the bulletins sent out by the United States Department of Agriculture. For many we are indebted to our friends: Miss Lenna Frances Cooper, director of the Battle Creek Sanitarium School of Economics, and author of "The New Cookery;" Mr. H. S. Anderson, dietitian of the Loma Linda Sanitarium, and author of "Food and Cookery;" and to Mr. E. G. Fulton, for many years proprietor of the Vegetarian Cafeteria, Los Angeles, and author of the "Vegetarian Cookbook." A number of recipes have also been taken from the "Manual of Recipes" of the Washington Sanitarium, Washington, D. C.

To these most excellent and reliable authorities on hygienic and scientific cookery, we would recommend those who desire to inquire further into the detail of Modern Culinary Art.

## (A) BREADS AND BREAKFAST DISHES

### 1. Whole-Wheat Gems ("Manual of Recipes," Washington Sanitarium)

| | |
|---|---|
| 1 egg | 1 cup white flour |
| 1 cup milk | ¾ cup whole-wheat flour |

Salt to taste

Break egg into batter bowl, add milk and salt. Sift flour before measuring and add it a handful at a time, beating briskly. *Do not stir.* Beat thoroughly for a few minutes, then pour into gem irons, heated, but not too hot, and slightly oiled. Bake 30 to 40 minutes.

To make the mathematical calculation plain, we will work out entire the simple problem of estimating the food value for the recipe given above, referring to Table II in the Appendix:

| | Protein | Fat | Carbo. | Total | |
|---|---|---|---|---|---|
| 1 egg | 25 | 50 | .. | 75 | (see p. 331) |
| 1 cup milk | 30 | 83 | 47 | 160 | (see p. 331) |
| 1 cup white flour | 63 | 15 | 438 | 516 | (see p. 341) |
| ¾ cup whole-wheat flour | 60 | 19 | 314 | 393 | (see p. 341) |
| Salt | .. | .. | .. | .. | |
| Total calories in recipe | 178 | 167 | 799 | 1,144 | |

This will make about 12 gems.

Dividing by 12, we find that each gem contains 15 calories protein, 14 of fat, 67 of carbohydrate,— a total of 96, making 16 per cent protein, 15 per cent fat, and 69 per cent carbohydrate.

### 2. Graham Puffs ("One Hundred Recipes," Lenna Frances Cooper)

| | |
|---|---|
| 1 egg | 1½ cups Graham flour |
| 1 cup milk | ¼ teaspoon salt |

Beat egg, add milk, salt, and lastly the Graham flour. Beat about five minutes or until batter is smooth. Fill

hot gem irons full to the brim, and bake in a moderate oven 20 to 30 minutes. Number of puffs, about 12.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 172 | 181 | 668 | 1,021 | 17 | 18 | 65 |
| In one puff: | | | | | | |
| 14 | 15 | 56 | 85 | 17 | 18 | 65 |

### 3. Corn Bread Without Baking Powder ("Food and Cookery," Anderson)

1 cup cornmeal
2 tablespoons flour
1 tablespoon sugar
2 eggs (separated)
1¼ cups boiling water
1½ teaspoons salt

Sift dry ingredients together, stir smooth with one cup of boiling water. With the remaining one-fourth cup of water, make a batter that will barely drop from the spoon. Beat eggs separately. Fold yolks into whites and turn them into the batter, folding them in with a wire batter whip; mix lightly, yet thoroughly. Pour into oiled granite pan and bake in a moderately hot oven 20 to 30 minutes. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 110 | 125 | 545 | 780 | 14 | 16 | 70 |
| In one serving: | | | | | | |
| 18 | 21 | 91 | 130 | 14 | 16 | 70 |

### 4. Cream Rolls ("Food and Cookery," Anderson)

1½ cups flour
½ cup thin cream
½ teaspoon salt

Sift the flour and salt into the mixing bowl, pour the cream on all at once, and draw the flour in from the sides of the bowl, so as to mix evenly and not stir any into batter. Work it into a stiff dough in the bowl, then turn out on a slightly floured board and work together for a few minutes; roll out to about one-third inch in thickness, with a dull knife cut into long strips

about one-third inch wide, roll on board, and cut into two-inch lengths. Lay in baking pan, leaving a little space between, and bake in a medium oven until crisp and a light brown. Number of rolls, 24.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 106 | 226 | 681 | 1,013 | 12 | 22 | 66 |
| In one roll: | | | | | | |
| 5 | 9 | 28 | 42 | 12 | 22 | 66 |

## 5. Whole-Wheat Sticks ("Food and Cookery," Anderson)

1 cup flour
⅓ cup whole-wheat flour
1⅓ tablespoons oil
¼ teaspoon salt
⅓ cup cold water

Emulsify the oil by beating thoroughly while adding water a drop at a time. This will take only a portion of the one-third cup of water. To the sifted flour and salt, add the oil, which has previously been emulsified, and rub evenly through the flour. Add the remainder of the water all at once and mix evenly. Knead on a board and roll out into one-third inch thickness.

Cut with a dull knife into strips one-third inch wide and three inches long. Bake in medium oven. Number of sticks, 24.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 90 | 202 | 578 | 870 | 10 | 23 | 67 |
| In one stick: | | | | | | |
| 4 | 8 | 24 | 36 | 10 | 23 | 67 |

## 6. Corn Dodgers ("Food and Cookery," Anderson)

1 cup cornmeal (preferably toasted lightly in oven)
1½ tablespoons vegetable fat
1 tablespoon brown sugar
½ teaspoon salt
1½ cups boiling water

Mix all dry ingredients, add the fat, and pour on the boiling water all at once and stir smooth. A few table-

spoons of water may be added if needed to make the batter of a consistency barely to drop from spoon but not run. Drop from the side of a large spoon into an oiled baking pan in oblong shapes, and bake in a quick oven. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 52 | 225 | 487 | 764 | 7 | 30 | 63 |
| In one serving: | | | | | | |
| 9 | 37 | 81 | 127 | 7 | 30 | 63 |

### 7. Oatmeal Bread [1] (Mrs. Jessica Hazard, Official Demonstrator Food Conservation Campaign)

1 cup milk and water or all water
1 teaspoon salt
1 tablespoon fat
2 tablespoons sugar
1 cup rolled oats
2½ cups wheat flour (or substitute, as rice flour)
½ cake yeast dissolved in ¼ cup warm water

Put oats through mill or grinder. Scald the liquid and pour it over the rolled oats, then add the sugar, fat, and salt. Let stand until about lukewarm (about half an hour). Add yeast. Add flour and knead. Let rise until double its bulk. Knead again and place in pan. When light, bake in a moderate oven 45 to 90 minutes.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 265 | 260 | 1,412 | 1,937 | 14 | 14 | 72 |
| In average slice: | | | | | | |
| 15 | 15 | 78 | 108 | 14 | 14 | 72 |

### 8. "Rye and Injun Bread"

2 cups cornmeal
4 cups rye flour
2 tablespoons oil
2 tablespoons sugar
1 teaspoon salt
1 cake compressed yeast
4 cups water

[1] United States Leaflet No. 6 gives the same recipe, omitting the sugar and fat

Dissolve yeast in cup warm water. Scald two-thirds cup cornmeal with three cups water. Let stand one-half hour or until lukewarm, and add yeast. Then add 2 cups rye flour, one-third cup cornmeal, oil, sugar, and salt. Let this sponge rise. When light, add 1 cup cornmeal and 2 cups rye flour. Mold into two loaves as soft as can be handled. Let rise until twice its bulk. Bake.

| | Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|---|
| Calories in recipe: | 260 | 364 | 2,810 | 3,434 | 8 | 10 | 82 |
| In average slice: | 7 | 10 | 78 | 95 | 8 | 10 | 82 |

### 9. Home-Ground Wheat Bread (Food Thrift Series No. 2, United States Department of Agriculture)

- 3 cups wheat meal (or 2 cups wheat meal and 1 cup white flour)
- $1\frac{1}{4}$ cups lukewarm water
- $\frac{1}{2}$ cake compressed yeast
- 1 level teaspoon salt
- 1 level tablespoon sugar
- 1 level tablespoon shortening if desired

Mix the yeast with a small amount of lukewarm water; dissolve the sugar and salt in the rest of the water; mix the two solutions and add all to the meal (or meal and flour). Mix thoroughly so that all the liquid is incorporated in the mass, cover, and set in a moderately warm place to rise. After about two hours, or when well risen, add the shortening and knead well, adding a little meal if necessary, until a smooth, elastic dough has been formed. Cover and set aside again to rise for an hour. Knead lightly, form into a loaf, place in a greased pan; allow to rise until just double in bulk (this is only two thirds of the usual rise in the pan when white bread is made). Bake slowly for three fourths of an hour.

Calories per slice would vary slightly from bread as given in tables Chapter VI, in that there would be a somewhat higher proportion of protein.

### 10. Oven Toast (Zwieback)

Cut bread in slices. Brown slowly in oven until crisp all through. Bread may be dried out in the sunshine before putting in oven. (For calories, see page 329.)

### 11. Fruit Toast

Use any canned or stewed fruit, or fruit juice. Heat, thicken slightly with cornstarch, and pour over moistened oven toast. Calories in one serving:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 15 | 7 | 136 | 158 | 9½ | 4½ | 86 |

### 12. Prune Fluff Toast ("Manual of Recipes," Washington Sanitarium)

½ cup prune purée or marmalade
2 egg whites
¾ cup sugar
Vanilla or other flavoring

Add sugar and flavoring to stiffly beaten whites. Add prune purée and beat well. Serve hot or cold on moistened oven toast. Oven toast may be moistened with cream if desired. Number of servings, 6.

Calories in recipe (not including oven toast):

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 53 | 1 | 386 | 440 | 12 | .. | 88 |
| In one serving (not including oven toast): | | | | | | |
| 9 | .. | 64 | 73 | 12 | .. | 88 |

If cream is added to the oven toast, the extra calories can easily be calculated.

### 13. Cream Tomato Toast

1 cup strained tomatoes
1 teaspoon sugar
¾ cup milk
1 teaspoon flour

Heat tomatoes, add sugar and salt. Heat milk, thicken, and add slowly to heated tomato. (See recipe 27.) Use no soda. Serve on oven toast. Number of servings, 6.

Calories in recipe (not including oven toast):

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 31 | 68 | 109 | 208 | 15 | 33 | 52 |

In one serving (not including oven toast):

| | | | | | | |
|---|---|---|---|---|---|---|
| 5 | 11 | 18 | 34 | 15 | 33 | 52 |

## 14. Cream Purée of Peas on Toast

| | |
|---|---|
| 1 cup peas | Flour |
| 1 cup (or less) milk | Salt |

Press peas through a colander, add milk and salt, and thicken. Serve over moistened oven toast.

Calories in recipe (not including oven toast):

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 92 | 96 | 230 | 418 | 22 | 23 | 55 |

In one serving (not including oven toast):

| | | | | | | |
|---|---|---|---|---|---|---|
| 15 | 16 | 38 | 69 | 22 | 23 | 55 |

## 15. Cream Egg Toast

| | |
|---|---|
| 1 pint milk | Flour |
| 2 eggs | Salt |

Scramble the eggs, add milk, thicken, and salt to taste. Pour over moistened oven toast. Minced parsley may be added.

Calories in recipe (not including oven toast):

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 118 | 274 | 146 | 538 | 22 | 51 | 27 |

In one serving (not including oven toast):

| | | | | | | |
|---|---|---|---|---|---|---|
| 19 | 46 | 24 | 89 | 22 | 51 | 27 |

## 16. Nut Cream Toast

Make cream sauce by thickening one pint of milk with flour. Rub one tablespoon of peanut butter smooth with water, and add. Salt. Reheat, and serve over oven toast. Number of servings, 6.

Calories in recipe (not including oven toast):

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 85 | 236 | 156 | 477 | 18 | 49 | 33 |
| In one serving (not including oven toast): | | | | | | |
| 14 | 39 | 26 | 79 | 18 | 49 | 33 |

## 17. Nut Tomato Toast

1 can tomatoes strained
2 tablespoons peanut butter
2 tablespoons browned flour
Salt

Emulsify peanut butter; add to strained tomato. Thicken with browned flour. Salt to taste. Heat and serve over whole-wheat oven toast which has first been dipped in hot water. Number of servings, 4 to 6.

Calories in recipe (not including oven toast):

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 80 | 143 | 196 | 419 | 19 | 34 | 47 |
| In one serving (not including oven toast), if four servings: | | | | | | |
| 20 | 36 | 49 | 105 | 19 | 34 | 47 |

## 18. Hygienic Hot Cakes ("Vegetarian Cookbook," E. G. Fulton)

2 eggs
2 cups bread crumbs
½ cup flour
½ teaspoon salt
1 tablespoon sugar
About 1½ cups milk

Mix thoroughly the bread crumbs, flour, salt, and sugar. Add sufficient milk heated to 140° or 150° to make a thick pour batter, and into this beat the yolks of the eggs. Add the stiffly beaten whites and bake on a soapstone griddle. Be careful not to have the milk *scalding* hot. Number of cakes, 8.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 179 | 260 | 669 | 1,108 | 16 | 23 | 61 |
| In one cake: | | | | | | |
| 22½ | 32½ | 83 | 138 | 16 | 23 | 61 |

### 19. Oatmeal Gruel

| | |
|---|---|
| 3 tablespoons rolled oats, or 2 tablespoons oatmeal | 1 pint water |
| | Salt to taste |

Add oats to the salted boiling water. Let boil 10 minutes, then cook 3 hours in a double boiler. Strain and add one-half cup evaporated milk or cream. Number of servings, 3.

Calories in recipe if milk is used:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 49 | 105 | 122 | 276 | 18 | 38 | 44 |
| In one serving: | | | | | | |
| 16 | 35 | 41 | 92 | 18 | 38 | 44 |

Calories in recipe if cream is used:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 31 | 223 | 102 | 356 | 9 | 63 | 28 |
| In one serving: | | | | | | |
| 10 | 74 | 34 | 118 | 9 | 63 | 28 |

NOTE.— While usually considered invalid dishes, gruels make a pleasant variation from the monotony of the ordinary mush for even the healthy members of the family. They may be prepared as above from any other cereal. Very nice gruels may be made from left-over cereals. Reheat the left-over cereal and thin; press through a colander or strainer, and add milk or cream. Gruels may also be made from corn flakes, shredded wheat, etc., by softening in boiling water, running through a colander, and adding evaporated milk or cream.

### 20. Gluten Gruel

| | |
|---|---|
| 1 pint boiling water | ½ cup 20-per-cent gluten meal[2] |
| Salt to taste | |

Add gluten to the boiling water, stirring constantly. Boil until thickened and add one-half cup cream or evaporated milk. Number of servings, 6.

[2] Gluten is a meal made from wheat, and contains a higher proportion of gluten (wheat protein) than ordinary flour. This can be obtained from the Battle Creek Sanitarium, Battle Creek, Mich. Two grades may be obtained, containing 20-per-cent and 40-per-cent gluten, respectively.

Calories in recipe if evaporated milk is added:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 89 | 91 | 294 | 474 | 18 | 19 | 63 |
| In one serving: | | | | | | |
| 28 | 30 | 98 | 156 | 18 | 19 | 63 |

Calories in recipe if cream is added:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 67 | 209 | 274 | 550 | 12 | 38 | 50 |
| In one serving: | | | | | | |
| 22 | 70 | 91 | 183 | 12 | 38 | 50 |

### 21. Browned Rice

Put rice in shallow pan and place in a moderate oven for about three fourths of an hour, or until rice is a golden brown. Stir occasionally. Then cook in a double boiler until tender. Serve with milk or cream.

For calories in serving, see page 35.

### 22. Baked Oats

1 cup oatmeal or rolled oats
1 cup milk
Salt

Place oats in a pan or baking dish. Cover with the milk. Add salt. Let stand all night. In the morning bake one hour in a moderate oven. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 130 | 126 | 484 | 740 | 18 | 17 | 65 |
| In one serving: | | | | | | |
| 22 | 21 | 80 | 123 | 18 | 17 | 65 |

## (B) SOUPS

### 23. Vegetable Bouillon ("Manual of Recipes," Washington Sanitarium)

1 pint strained tomatoes
1 pint potato water
2 medium-sized onions
½ cup chopped celery
1 pint split pea broth or bean broth

Cook tomato, chopped onion, and celery together slowly one and one-half to two hours; add one bay leaf, a pinch of thyme and sage, broth from peas, and potato water. Strain through strainer, salt to taste, reheat, and serve. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 143 | 95 | 317 | 255 | 26 | 17 | 57 |
| In one serving: | | | | | | |
| 24 | 16 | 53 | 93 | 26 | 17 | 57 |

(See also recipe, page 258.)

## 24. Vegetable Broth

- Parings from 6 potatoes
- Parings from 3 or 4 carrots
- 2 red onions
- 1 cup strained tomato
- 2 tablespoons oatmeal
- The tops of a bunch of celery
- 1 cup or more of spinach water
- Celery salt
- Pinch of thyme or bay leaf
- Salt to taste

Scrub thoroughly all vegetables before paring. Put to cook in cold water. Cook all the vegetables together with the oatmeal, slowly two or three hours, adding enough water so that there will be about one quart of broth when done. Or, after cooking for one-half hour, they may be placed in a fireless cooker. Strain, and add the spinach water and seasoning. Reheat and serve. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 143 | 62 | 195 | 400 | 35 | 15 | 50 |
| In one serving: | | | | | | |
| 24 | 10 | 33 | 67 | 35 | 15 | 50 |

The above recipe can be varied in many ways. More or less of the mentioned vegetables may be used, and to these may be added many others, as lettuce leaves, cabbage leaves, turnip parings, etc.

The broth may be served without the spinach water,

substituting water drained from potatoes or other vegetables. Whole potatoes and carrots may be used.

### 25. Potato Soup Stock

| | |
|---|---|
| 5 or 6 large potatoes | 2 or 3 onions (preferably red) |

Scrub thoroughly and cut up without paring potatoes or removing outer onion skins. Put to cook in two quarts of cold water. Let cook till done, adding more water if necessary. Press through a colander or strainer. The potato broth and purée, of which there will be about two quarts, may be used as a basis for the following soups, as well as for many others.

In the making of this soup stock there may be cooked with the potato and onion any other vegetables, as carrots, tomato, cabbage or lettuce leaves, celery tops, etc. Or the soup stock may be made from potato parings alone, with or without the parings and outer leaves of other vegetables. If parings alone are used, it will be well to cook with them two tablespoons of oatmeal or other cereal, that the soup stock may have sufficient body to it.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 50 | 10 | 420 | 480 | 11 | 2 | 87 |

NOTE.— As much of the protein is near the skin, the more of the skins used the higher the relative protein content, until a broth (without the pulp) made from vegetable skins and leaves alone, may have the following high protein value:

Calories in two quarts vegetable broth:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 179 | 9 | 32 | 220 | 81 | 4 | 15 |

### 26. Cream of Potato Soup

Thin potato soup stock as necessary to make proper consistency, add one cup evaporated milk, one-half teaspoon

thyme, and salt to taste. Chopped parsley may be used as seasoning instead of the thyme. Use no butter or other fat. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 110 | 182 | 508 | 800 | 14 | 23 | 63 |
| In one serving: | | | | | | |
| 18 | 30 | 85 | 133 | 14 | 23 | 63 |

## 27. Cream of Tomato Soup

To one and one-half pints potato soup stock, add one and one-half pints strained tomato. Salt to taste, and bring to boil. To the hot, but not boiling, tomato soup add one cup of hot condensed milk to which a little salt has been added. Serve at once. Another method to prevent curdling is to put all ingredients together cold, then heat and serve. Never use soda. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 115 | 191 | 366 | 672 | 17 | 29 | 54 |
| In one serving: | | | | | | |
| 19 | 32 | 61 | 112 | 17 | 29 | 54 |

## 28. Tomato Corn Soup

| | |
|---|---|
| 1 cup potato soup stock | 1 can corn |
| 1 can tomatoes | Salt |

Strain tomatoes, purée can of corn, or use without puréeing. Add both to potato soup stock. Thin, if necessary, with water or other vegetable broth. Salt to taste. Heat and serve. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 181 | 90 | 746 | 1,017 | 18 | 9 | 73 |
| In one serving: | | | | | | |
| 30 | 15 | 124 | 169 | 18 | 9 | 73 |

## 29. Tomato Gluten

| | |
|---|---|
| 1 can tomatoes | 1 onion |
| Tops of bunch of celery | ½ cup gluten |

Strain tomatoes. Cook celery tops with the onion one hour or longer and add the broth to strained tomato. Salt to taste. Boil and thicken by pouring in gradually the gluten, stirring well. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 141 | 35 | 443 | 619 | 22 | 6 | 72 |
| In one serving: | | | | | | |
| 23 | 6 | 74 | 103 | 22 | 6 | 72 |

## 30. Cream of Corn Soup

To two pints potato soup stock, add two cups canned corn and one cup evaporated milk. Add water if necessary to make the soup the proper consistency. Salt to taste. The corn may or may not be put through a colander before adding to soup stock. Number of servings, 8.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 145 | 237 | 699 | 1,081 | 13 | 22 | 65 |
| In one serving: | | | | | | |
| 18 | 30 | 87 | 143 | 13 | 22 | 65 |

## 31. Cream of Bean Soup

Cook two-thirds cup of beans. Press through a colander and add, with the bean broth, to one pint of potato soup stock. Thin as necessary and add one cup evaporated milk. Season with thyme and salt to taste. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 187 | 196 | 494 | 877 | 21 | 23 | 56 |
| In one serving: | | | | | | |
| 31 | 33 | 82 | 146 | 21 | 23 | 56 |

## 32. Tomato Bean Soup

1 can tomatoes strained
1 pint potato soup stock
1 cup beans
Salt
Celery salt

Cook beans and press through a colander; add tomatoes and potato soup stock. Thin, if necessary, with water or other vegetable broth. Heat, season with salt and celery salt. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 222 | 49 | 691 | 962 | 23 | 5 | 72 |
| In one serving: | | | | | | |
| 37 | 8 | 115 | 160 | 23 | 5 | 72 |

## 33. Cream of Pea Soup

Make as recipe 31, using green peas instead of beans. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 169 | 187 | 465 | 821 | 21 | 23 | 56 |
| In one serving: | | | | | | |
| 28 | 31 | 78 | 137 | 21 | 23 | 56 |

## 34. Cream of Celery Soup

Cook with the potato stock the tops of one bunch of celery. Strain and add milk as for cream of potato soup. Salt to taste. Cut up celery and cook it separately. Add cooked celery to soup; heat thoroughly and serve. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 125 | 184 | 529 | 838 | 15 | 22 | 63 |
| In one serving: | | | | | | |
| 21 | 31 | 88 | 140 | 15 | 22 | 63 |

### 35. Cream of Spinach Soup

To one and one-half pints of potato soup stock, add one pint of spinach water or of spinach purée. Add one cup of evaporated milk, salt to taste. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 124 | 178 | 254 | 556 | 23 | 32 | 45 |
| In one serving: | | | | | | |
| 21 | 30 | 42 | 93 | 23 | 32 | 45 |

NOTE.— To any of the above soups may be added the water in which any vegetable has been cooked. Various combinations may be made, with many pleasing results in delicious and savory flavors. Beet juice, turnip water, asparagus broth, etc., may be added in varying amounts, depending upon individual preference, and there need be no monotony in the soups served. Cream may be used instead of milk; or, if preferred, the soups may be served without the addition of milk or cream. If served without milk or cream, it may be an advantage to thicken them slightly with a cereal, as gluten, cream of barley, or oatmeal. Left-over cereal may be added to the soups with satisfactory results. In addition to salt, other seasonings, as parsley, thyme, bay leaf, sweet basil, may be used. But no fat of any kind need ever be added.

### 36. Tomato Bisque

2 cups strained tomato
1 cup water
1 cup bean broth or potato water
2 teaspoons peanut butter, rubbed smooth in water
Salt

Put all together and cook well. Salt to taste. Number of servings, 4.

Calories in recipe if made with bean broth:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 57 | 51 | 194 | 302 | 18 | 17 | 65 |
| In one serving: | | | | | | |
| 14 | 13 | 48 | 75 | 18 | 17 | 65 |

Calories in recipe if made with potato water:

| Protein | Fat | Carbohydrate | | Per Cent | Per Cent | Per Cent |
|---|---|---|---|---|---|---|
| 45 | 25 | 106 | 176 | 25 | 13 | 62 |
| In one serving: | | | | | | |
| 11 | 6 | 26 | 43 | 25 | 13 | 62 |

## 37. Vegetarian Consommé

Skins of 6 or 8 potatoes
3 red onions
Tops of bunch of celery
Tops of bunch of carrots
1 can tomatoes, strained

Turnip or beet tops or spinach may be used. Put all, except the tomato, to cook in cold water. Cook slowly one and one-half to two hours. Drain off the rich brown liquor, to which add the tomato juice, and salt to taste. Reheat and serve. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 215 | 24 | 152 | 391 | 55 | 6 | 39 |
| In one serving: | | | | | | |
| 36 | 4 | 25 | 65 | 55 | 6 | 39 |

## 38. Corn Chowder

1 medium onion
¼ teaspoon celery salt
1 pint bean broth
3 hard-boiled eggs, diced
3 potatoes, diced
1 pint tomato water
1 cup canned corn
1 cup strained tomato
Salt to taste
Pinch of sage

Add diced potatoes and grated onion to the bean broth and tomato. Cook until potatoes are tender, add rest of ingredients and milk to make two quarts. Thicken the milk slightly before adding. Number of servings, 8.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 210 | 207 | 497 | 914 | 23 | 23 | 54 |
| In one serving: | | | | | | |
| 26 | 26 | 62 | 114 | 23 | 23 | 54 |

### 39. Vegex Broth

Mix one teaspoon Vegex with one cup boiling water, and serve. Vegex may be added in this proportion to other soups and to gravies. It gives a very meaty flavor.

Calories in serving of five ounces:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 20 | 2 | .. | 22 | 91 | 9 | .. |

NOTE.— Vegex is a vegetable extract obtainable at large grocery houses. There are other like preparations on the market, as herbex, savora, etc., which may be used in the same way.

## (C) MEAT SUBSTITUTES AND ENTREES

### 40. Bean Croquettes

| | |
|---|---|
| 2 cups mashed beans | Sage |
| 1 cup tomato pulp with juice | Salt |
| 1 egg (or more if desired) | Celery salt |

1 minced onion

Mix, roll in corn flakes or oven-toast crumbs and egg, shape into patties, and bake in oven. Serve with brown sauce or tomato sauce. (See recipes 68 and 69.) Number of croquettes, 10.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 289 | 150 | 753 | 1,192 | 24 | 13 | 63 |
| In one croquette: | | | | | | |
| 29 | 15 | 75 | 119 | 24 | 13 | 63 |

### 41. Ribbon Loaf (Washington Sanitarium)

| | |
|---|---|
| 1 cup navy beans | 1 cup evaporated milk |
| 1 cup pink or kidney beans | Salt |

Cook separately till tender and quite dry. Salt while cooking. Rub through a colander. Add one-half cup of evaporated milk (or cream) to each kind of beans.

Place beans, in alternate layers, in a pan and brown slightly in a moderate oven. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 406 | 226 | 994 | 1,626 | 25 | 14 | 61 |
| In one serving: | | | | | | |
| 68 | 38 | 165 | 271 | 25 | 14 | 61 |

### 42. Potose Patties or Loaf [3]

1 onion grated
2 tomatoes or their equivalent in canned tomatoes
Pinch of thyme or sage
Salt to taste
1 egg
¼ pound can of protose
1 cup zwieback crumbs

Put in a dish all the ingredients except the egg and the crumbs. Moisten the crumbs with hot water or hot vegetable broth, beat egg and add to the crumbs, then mix all together well. The whole should be sufficiently moist to mold into patties. Cut the patties through the center and brown in a slightly oiled pan over the fire or bake in the oven. Or it may be baked in the form of a loaf. Serve with brown gravy. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 162 | 133 | 282 | 577 | 28 | 23 | 49 |
| In one serving: | | | | | | |
| 27 | 22 | 47 | 96 | 28 | 23 | 49 |

### 43. Protose with Onion

1 pound protose
1 cup strained tomato
½ teaspoon salt
2 large onions
Pinch of sage

Slice the protose and the onion and place in dish in alternate layers. Cover with strained tomato, add the

[3] Protose is a food preparation manufactured by the Battle Creek Health Food Company, Battle Creek, Mich. Its food value approximates that of meat. It may be obtained at any grocery store carrying Battle Creek Sanitarium Foods, or by sending direct to Battle Creek. A like preparation under the name Nut Cero is made by the St. Helena Sanitarium Food Company. Nuttolene is also a meat substitute, put out by the Battle Creek Health Food Company.

salt and sage. Bake in a slow oven for an hour or more. Watch carefully, and if protose seems dry, add water. Brown sauce may be used instead of tomato. To obtain best results, use plenty of liquid. More satisfactory results may be obtained by covering well with the sauce, and baking in a covered baking dish. Number of servings, 8.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 390 | 267 | 264 | 921 | 43 | 29 | 28 |
| In one serving: | | | | | | |
| 49 | 33 | 33 | 115 | 43 | 29 | 28 |

### 44. Braised Protose

Cut one pound of protose in half slices one-half inch thick. Lay in an oiled pan and warm through slowly in a moderate oven. Number of servings, 8.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 390 | 269 | 264 | 921 | 43 | 29 | 28 |
| In one serving: | | | | | | |
| 49 | 33 | 33 | 115 | 43 | 29 | 28 |

### 45. Nut Fillet

| | |
|---|---|
| ½ lb. nuttolene | Salt |
| ½ lb. protose | Celery salt |
| 1 onion | Sage |

Brown sauce (see recipe 68)

Cut nuttolene and protose in half slices one-fourth inch thick. Arrange in an oiled pan a layer each of protose and nuttolene, with a slice of onion between, placing nuttolene on the bottom. A toothpick through the center of each layer will hold protose and nuttolene in place. Sprinkle with salt, celery salt, and sage. Cover well with brown sauce and bake about three fourths of an hour in a moderate oven. Strained tomatoes or tomato

sauce may be used instead of brown sauce. Number of servings, 8.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 353 | 363 | 276 | 992 | 36 | 37 | 27 |
| In one serving: | | | | | | |
| 45 | 46 | 35 | 126 | 36 | 37 | 27 |

## 46. Protose and Potato Hash

| | |
|---|---|
| 4 to 6 potatoes | 1 chopped onion |
| ½ lb. protose | Salt |

Chop potatoes, protose, and onion, and mix thoroughly. Brown in a skillet or in an oven. The mixture may be formed into patties if desired. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 249 | 137 | 646 | 1,032 | 24 | 13 | 63 |
| In one serving: | | | | | | |
| 41 | 23 | 108 | 172 | 24 | 13 | 63 |

## 47. Homemade Protose

| | |
|---|---|
| 2 cups peanut butter | 3 tablespoons cornstarch |
| 2 cups mashed beans | 1 teaspoon chopped onion |
| 4 cups water (or better, potato water or other vegetable broth) | Pinch of sage<br>Salt to taste |

Mix ingredients thoroughly, and steam in double boiler three hours, stirring occasionally. Let cool. Run knife around edge and turn out. Cut in slices. It may be served cold with tomato sauce or used in any recipe calling for protose. This will make about three pounds of protose and 24 servings.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 715 | 1,887 | 952 | 3,554 | 20 | 53 | 27 |
| In one serving: | | | | | | |
| 30 | 79 | 40 | 149 | 20 | 53 | 27 |

NOTE.— This protose is much higher in fat, with less protein, than Battle Creek Sanitarium protose. However, it is fairly high in protein and may be used with advantage. Care should be taken that it be served with gravies not too rich in fat.

### 48. Cottage Cheese Omelet

| | |
|---|---|
| 2 eggs | ¼ teaspoon salt |
| ½ cup milk | ½ cup cottage cheese |

Add milk and salt to the egg; beat thoroughly. Add cottage cheese and beat again. Bake in a moderate oven twenty to thirty minutes. Number of servings, 2.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 125 | 182 | 37 | 344 | 36 | 53 | 11 |
| In one serving: | | | | | | |
| 62 | 91 | 18 | 171 | 36 | 53 | 11 |

### 49. Cottage Cheese and Nut Roast (Food Thrift Series No. 2, United States Department of Agriculture)

| | |
|---|---|
| 1 cup cottage cheese | 2 tablespoons chopped onions |
| 1 cup chopped English walnuts | Juice of ½ lemon |
| 1 cup bread crumbs | Salt to taste |

Cook the onion slowly in a little water until tender. Mix the other ingredients and moisten with the water in which the onion has been cooked. Pour into a shallow baking dish and brown. Number of servings, 10.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 295 | 1,044 | 334 | 1,673 | 18 | 62 | 20 |
| In one serving: | | | | | | |
| 30 | 104 | 33 | 167 | 18 | 62 | 20 |

### 50. Boston Roast (Food Thrift Series, United States Department of Agriculture)

| | |
|---|---|
| 2 cups mashed beans | 2 tablespoons chopped onion |
| 1 cup cottage cheese | Salt |
| Bread crumbs as needed | Celery salt or sage |

Cook onions in a little water until tender. Add onions and cheese to the beans and bread crumbs to make mixture stiff enough to be formed into a roll. Bake in a moderate oven, basting occasionally with a little oil and water. Serve with tomato sauce. (See recipe 69.) Number of servings, 10.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 380 | 134 | 677 | 1,191 | 32 | 11 | 57 |
| In one serving: | | | | | | |
| 38 | 13 | 68 | 119 | 32 | 11 | 57 |

## 51. Carrot and Nut Loaf

1 cup mashed carrots
2 eggs
1 onion minced
½ cup chopped walnuts
Bread crumbs as needed
Salt

Mix thoroughly, adding enough bread crumbs to make it the proper consistency. Bake in oiled pan, slice, and serve with tomato sauce. Number of servings, 8.

Calories in recipe without sauce:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 127 | 578 | 193 | 898 | 14 | 64 | 22 |
| In one serving: | | | | | | |
| 16 | 72 | 24 | 112 | 14 | 64 | 22 |

## 52. Eggplant Croquettes

1 medium-sized eggplant
Bread or cracker crumbs
2 (or 3) eggs, well beaten
Salt to taste

Boil, drain, and mash eggplant, and add bread or cracker crumbs until right consistency to handle. Shape into croquettes, and roll in bread or cracker crumbs. Bake in oiled pan. Number of servings, 8.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 141 | 184 | 555 | 880 | 16 | 21 | 63 |
| In one serving: | | | | | | |
| 18 | 23 | 69 | 110 | 16 | 21 | 63 |

## 53. Celery and Nut Roast

| | | | |
|---|---|---|---|
| 2 | eggs | 1 | cup chopped celery |
| 1½ | cups milk | 1⅛ | cups fine toasted crumbs |
| ¾ | cup finely chopped nuts | 1 | teaspoon salt |
| | | 1 | tablespoon grated onion |

Beat the eggs, add milk, nuts, salt, crumbs, onion, and celery. Let stand twenty minutes. Bake in an oiled tin about thirty minutes or until well browned. To remove, turn upside down on a platter and cover with a cloth wrung out of cold water, allowing it to stand a few minutes or until loosened from the pan. Garnish with parsley and serve with parsley sauce or cream sauce. Number of servings, 8.

Calories in recipe without sauce:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 212 | 943 | 356 | 1,511 | 14 | 63 | 23 |
| In one serving: | | | | | | |
| 26 | 118 | 45 | 189 | 14 | 63 | 23 |

## 54. Nut Tomato Rice

Make sauce same as for recipe 17. Boil one cup of rice. Add sauce. Reheat and serve, or bake in a moderate oven for twenty minutes. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 154 | 150 | 930 | 1,234 | 13 | 12 | 75 |
| In one serving: | | | | | | |
| 26 | 25 | 155 | 206 | 13 | 12 | 75 |

## 55. Nut Tomato Macaroni

Prepare as in recipe 54, but bake thirty to forty minutes. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 139 | 152 | 520 | 811 | 17 | 18 | 65 |
| In one serving: | | | | | | |
| 23 | 25 | 87 | 135 | 17 | 18 | 65 |

## 56. Purée of Green Peas with Tomato Sauce

1 cup pea purée
½ cup zwieback crumbs
2 tablespoons evaporated milk

Mix well and salt to taste. Bake in a moderate oven. For tomato sauce, see recipe 69. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 129 | 96 | 479 | 704 | 18 | 14 | 68 |
| In one serving: | | | | | | |
| 21 | 16 | 80 | 117 | 18 | 14 | 68 |

## 57. Croquettes of Split Peas ("Food and Cookery," Anderson)

1 cup mashed peas
½ cup oven-toast crumbs
2 teaspoons cream
1 tablespoon grated onion

Put the cream and onion into a small saucepan on the stove and reduce to about one third. Mix all ingredients well, roll into round balls about the size of an egg, and form into oblong croquettes with a knife, having them about one inch thick, one inch wide, and one and one-half inches long. Mark the top with a knife. Brush over lightly with milk or cream and bake on the top grate in a hot oven. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 76 | 92 | 277 | 445 | 18 | 21 | 61 |
| In one serving: | | | | | | |
| 13 | 15 | 46 | 74 | 18 | 21 | 61 |

NOTE.— Croquettes may be made in this way from any legume or from corn.

## 58. Baked Purée of Lentils with Tomato Sauce

1 cup lentil purée
2 tablespoons evaporated milk
½ cup zwieback crumbs

Mix well. Salt to taste. Bake in moderate oven. For tomato sauce, see recipe 69. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 133 | 92 | 467 | 692 | 20 | 13 | 67 |
| In one serving: | | | | | | |
| 22 | 15 | 78 | 115 | 20 | 13 | 67 |

## (D) VEGETABLES

### 59. Browned Potatoes

1 quart steamed potatoes (about 6)
1 pint brown sauce

Place the potatoes in a dripping pan and cover with brown sauce (see recipe 68). Put in the oven and bake twenty to thirty minutes. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 117 | 17 | 639 | 773 | 15 | 2 | 83 |
| In one serving: | | | | | | |
| 19 | 3 | 107 | 129 | 15 | 2 | 83 |

NOTE.— The same recipe may be used, using potatoes raw instead of steamed and baking them until tender. More brown sauce will be needed.

### 60. Potato Puffs ("Manual of Recipes," Washington Sanitarium)

Add two eggs to one quart well-beaten mashed potatoes, beat well. Drop on oiled tin and brown in hot oven. Number of servings, 8.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 123 | 295 | 500 | 918 | 13 | 32 | 55 |
| In one serving: | | | | | | |
| 15 | 37 | 62 | 114 | 13 | 32 | 55 |

### 61. Stuffed Potatoes

Bake large potatoes. When done remove from oven. Cut in halves lengthwise, and remove from skins. Place

all together in pan. Mash well, beating till fluffy; add evaporated milk or cream. Salt to taste. Replace in skins, brown for a few minutes in oven, serve.

Calories in potato when ready to serve:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 16 | 31 | 88 | 135 | 12 | 23 | 65 |

### 62. Spinach Soufflé ("The New Cookery," Lenna Frances Cooper)

| | |
|---|---|
| 1 cup minced spinach | ⅔ cup milk |
| 3 eggs beaten separately | ¼ cup flour |
| ½ teaspoon salt | |

Rub flour and salt together; heat the milk and add slowly to the above, stirring to keep smooth; then add the spinach, the yolks beaten well, and lastly, the stiffly beaten whites. Bake twenty to thirty minutes in a moderate oven. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 136 | 227 | 174 | 537 | 26 | 43 | 31 |
| In one serving: | | | | | | |
| 23 | 38 | 29 | 89 | 26 | 43 | 31 |

### 63. Spinach

Wash thoroughly. Put to cook, adding very little, if any, water. Watch carefully so it does not scorch, or cook it in a double boiler. Cook twenty to thirty minutes. When done, drain, chop fine, and salt. Serve with lemon, and, if desired, sliced hard-boiled eggs. Add no fat. For calories, see pages 334 and 344.

Another very satisfactory way to cook spinach is to steam it. Do not put directly in steamer, but set in steamer the pan in which it is to be cooked. Cover well, so that steam will come in contact with spinach over sides of smaller pan. Other vegetables may be cooked in this way.

### 64. Scalloped Eggplant

| | |
|---|---|
| 1 eggplant | 1 egg |
| 1 cup milk | ⅔ cup oven-toast crumbs |
| Salt | |

Quarter the eggplant and cook in boiling water until tender. Drain, salt, and beat up with a fork. Add milk, egg, and oven-toast crumbs. Corn flakes or cracker crumbs may be used instead of the toast crumbs. Season with sage if desired. Bake thirty minutes in moderate oven. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 108 | 164 | 293 | 565 | 19 | 29 | 52 |
| In one serving: | | | | | | |
| 18 | 27 | 49 | 94 | 19 | 29 | 52 |

### 65. Baked Carrots

Slice four large carrots and place them in baking dish with alternate layers of corn flakes. Cover with milk. Season with salt. Bake in slow oven about forty-five minutes. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 54 | 99 | 162 | 315 | 16 | 30 | 54 |
| In one serving: | | | | | | |
| 9 | 16 | 27 | 54 | 16 | 30 | 54 |

NOTE.— For bananas served as a vegetable, see recipes 108 and 109.

## (E) GRAVIES

### 66. Egg Gravy

| | |
|---|---|
| 1 egg | Flour |
| 1½ cups potato water | Salt |
| ½ cup milk or evaporated milk | Celery salt |

Scramble egg, chop well, add potato water, seasoning, and milk. Number of servings, 6.

Calories in recipe with milk:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 82 | 93 | 88 | 263 | 32 | 34½ | 33½ |

In one serving:

| | | | | | | |
|---|---|---|---|---|---|---|
| 14 | 15 | 15 | 44 | 32 | 34 | 34 |

Calories in recipe with evaporated milk:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 97 | 134 | 112 | 343 | 28 | 39 | 33 |

In one serving:

| | | | | | | |
|---|---|---|---|---|---|---|
| 16 | 22 | 19 | 57 | 28 | 39 | 33 |

## 67. Nut Gravy (" Vegetarian Cookbook," E. G. Fulton)

1 pint water
1 cup strained tomato
1 dessertspoon peanut butter
Flour as necessary

Emulsify nut butter with tomato, add the water and the rest of the tomato. Thicken with flour. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 37 | 69 | 108 | 214 | 17 | 32 | 51 |

In one serving:

| | | | | | | |
|---|---|---|---|---|---|---|
| 6 | 11 | 18 | 36 | 17 | 32 | 51 |

## 68. Brown Sauce

4 potatoes or the parings of 6 potatoes
2 red onions
1 tomato
3 tablespoons flour
Salt
Sage
Juice of ½ lemon

Scrub the vegetables thoroughly, do not peel, cut up, and cook as for potato soup stock (recipe 25). Strain off one pint (or more) of the broth for the brown sauce. (Use the remainder, after straining through a colander, for soup.) Brown the flour in the oven or in a dry pan over the flame. Rub it smooth with water and thicken the vegetable broth. Add the juice of one-half lemon, a pinch of sage, salt to taste. Other vegetable broths or simply potato water may be used in the preparation of

this gravy. The addition of a little cereal coffee will deepen the brown color. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 57 | 11 | 105 | 173 | 32 | 7 | 61 |
| In one serving: | | | | | | |
| 9 | 2 | 17 | 28 | 32 | 7 | 61 |

## 69. Tomato Sauce

1 pint strained tomatoes
1 tablespoon minced onion
Flour browned as in recipe 68

Cook tomato and onion together twenty minutes, strain, thicken with the browned flour. Season with salt. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 33 | 59 | 142 | 234 | 14 | 25 | 61 |
| In one serving: | | | | | | |
| 5 | 10 | 24 | 39 | 14 | 25 | 61 |

## 70. Olive Sauce

12 ripe olives
2 cups brown sauce

Chop olives and stew slowly two or three hours. Add to brown sauce. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 52 | 214 | 135 | 401 | 13 | 54 | 33 |
| In one serving: | | | | | | |
| 9 | 36 | 22 | 67 | 13 | 54 | 33 |

## 71. Pea Tomato Sauce

2 cups green pea purée
1 cup strained tomato

Add the strained tomato to the green pea purée, and salt to taste. Heat and serve. A little browned flour may be used as thickening if desired. Number of servings, 6 to 12.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 148 | 21 | 448 | 617 | 24 | 3 | 73 |
| In one serving if six servings: | | | | | | |
| 25 | 3 | 75 | 103 | 24 | 3 | 73 |

### 72. Vegex Gravy

Add Vegex (see note under recipe 39) to any gravy in the proportion of one teaspoon Vegex to one pint gravy.

## (F) SALADS

### 73. Grape Salad

1 cup white grapes
⅓ cup blue grapes
1 cup sliced pineapple
1 egg
Marshmallows as desired
½ cup fruit juice

Seed grapes, and remove skins from white grapes. Thicken one-half cup fruit juice and add to beaten egg and pour over grapes and pineapple. Section marshmallows and add to salad just before serving. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 31 | 65 | 229 | 325 | 9 | 20 | 71 |
| In one serving: | | | | | | |
| 5 | 11 | 38 | 54 | 9 | 20 | 71 |

### 74. Fruit Salad

2 apples
3 oranges
2 bananas
1 small can pineapple
½ cup chopped nuts

Cut up the fruit and mix, together with the chopped nuts. Add pineapple juice, which will serve as a dressing (or omit pineapple and add cream dressing). Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 75 | 397 | 615 | 1,087 | 7 | 42 | 51 |
| In one serving: | | | | | | |
| 13 | 66 | 102 | 181 | 7 | 42 | 51 |

### 75. Apple and Celery Salad ("Manual of Recipes," Washington Sanitarium)

2 apples
½ cup celery
Cream dressing or golden dressing

Dice apples, chop celery, mix, and add dressing. Number of servings, 6.

Calories in recipe without dressing:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 4 | 11 | 120 | 135 | 4 | 9 | 87 |
| In one serving: | | | | | | |
| 1 | 2 | 20 | 23 | 4 | 9 | 87 |

### 76. Grapefruit Salad

Remove pulp from grapefruit and cut up. Add to this diced apples, sliced bananas, raisins or shredded dates, and chopped nuts. Add a dressing of grapefruit juice and honey. Replace in grapefruit skins. If one serving includes grapefruit, one third of a banana, one third of an apple, ten raisins, three walnuts, and one teaspoon of honey, the calories in each will be, approximately:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 20 | 88 | 167 | 275 | 7 | 32 | 61 |

### 77. Carrot and Cottage Cheese Salad

1 cup ground or grated carrots
⅓ cup chopped nuts
½ cup cottage cheese
Juice 1 large lemon
Salt to taste

Mix thoroughly. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 106 | 354 | 119 | 579 | 19 | 61 | 20 |
| In one serving: | | | | | | |
| 18 | 59 | 20 | 97 | 19 | 61 | 20 |

## 78. Tomato and Lettuce Salad

3 tomatoes
1 large head lettuce

Shred the lettuce and slice the tomatoes. Arrange in alternate layers in salad dish and cover with cream dressing (see recipes 87 and 88), or lemon dressing may be used. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 40 | 487 | 174 | 701 | 6 | 69 | 25 |
| In one serving: | | | | | | |
| 7 | 81 | 29 | 117 | 6 | 69 | 25 |

## 79. Cabbage Salad

1 medium cabbage shredded. Serve with cream dressing. (See recipes 87 and 88.) Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 62 | 224 | 109 | 395 | 15 | 58 | 27 |
| In one serving: | | | | | | |
| 10 | 37 | 18 | 65 | 15 | 58 | 27 |

## 80. String Bean Salad

Let two cups cooked string beans stand for one hour in lemon juice. Drain and serve with French salad dressing or mayonnaise. Number of servings, 6. Green peas may be served in the same way.

Calories in recipe without dressing:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 10 | 10 | 30 | 50 | 20 | 20 | 60 |
| In one serving: | | | | | | |
| 2 | 2 | 5 | 9 | 20 | 20 | 60 |

## 81. Italian Salad ("Food and Cookery," Anderson)

1 cup cooked macaroni cut into small rings
½ cup diced celery
⅔ cup finely diced raw carrots
½ cup cooked green peas
2 teaspoons grated onion
Mayonnaise

Mix all ingredients. Season with lemon dressing; serve on lettuce leaf. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 65 | 14 | 287 | 366 | 18 | 4 | 78 |
| In one serving: | | | | | | |
| 11 | 2 | 48 | 61 | 18 | 4 | 78 |

## 82. Raw Vegetable Salad

Use any combination of raw vegetables, chopped or cut into small cubes. Mix with mayonnaise or cream salad dressing or lemon juice and salt. Any or all of the following may be used: Carrots, turnips, beets, radishes, cabbage, lettuce, potatoes, celery, onions, parsley, cucumber, tomato.

Calories in one serving (approximately) without dressing:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 7 | 4 | 24 | 35 | 20 | 11 | 69 |

## 83. Tomato Jelly (" The New Cookery," Lenna Frances Cooper)

1 can tomatoes
3 bay leaves
1 medium onion
1 teaspoon salt
½ cup lemon juice
⅓ box vegetable gelatin (¼ oz.)
1 cup boiling water
2 tablespoons sugar

Put the tomatoes with the seasoning to cook until reduced one third. Then rub through colander. Prepare the vegetable gelatin by soaking in warm water about twenty minutes, draining, and cooking eight to ten minutes in one cup of boiling water. When cooked and strained, add to the tomatoes, turn into molds, and set in a cool place. The jelly may be cut into cubes or other shapes if desired and used as a garnish, or may be served as a salad with mayonnaise dressing. Number of servings, 12.

Calories in recipe without mayonnaise:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 45 | 17 | 326 | 388 | 11 | 4 | 85 |
| In one serving: | | | | | | |
| 4 | 1 | 27 | 32 | 12 | 3 | 85 |

### 84. Cucumber Jelly ("The New Cookery," Lenna Frances Cooper)

1¾ cups cucumber pulp
⅓ package vegetable gelatin (¼ oz.)
¼ cup lemon juice
1 cup water
½ teaspoon salt
A few drops of onion juice

To prepare the cucumber pulp, peel the cucumbers and grate them; strain through a colander, pressing through as much liquid as possible; add the lemon, onion juice, and salt. Prepare the vegetable gelatin as for tomato jelly and cook in one cup boiling water five to ten minutes. Strain and add to the juices. Turn into molds wet with cold water and let stand until firm. Serve in a lettuce leaf, with or without mayonnaise. Number of servings, 6.

Calories in recipe without mayonnaise:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 7 | 4 | 53 | 64 | 11 | 6 | 83 |
| In one serving: | | | | | | |
| 1 | 1 | 8 | 10 | 11 | 6 | 83 |

## (G) SALAD DRESSINGS

### 85. Mayonnaise Dressing

2 egg yolks
Juice of 1½ lemons
A little grated onion
Olive oil or salad oil as needed (about 1 cup)

The ingredients should be cold, having been on ice if possible.

Pour oil into egg yolks very slowly at first, *drop by drop,* beating constantly. Keep adding oil until eggs are very stiff, then add one teaspoon salt, the lemon juice, and grated onion or onion juice. If yolks and oil separate, add the beaten whites. Otherwise the whites need not be used unless desired.

Calories in serving of heaping teaspoon:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| .. | 50 | .. | 50 | .. | 100 | .. |

## 86. French Dressing

2 teaspoons lemon juice
2 tablespoons olive oil
Salt
Grated onion or ¼ teaspoon onion juice

Number of servings, 8 or one teaspoon each.

Calories per teaspoon:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| .. | 34 | .. | 34 | .. | 100 | .. |

NOTE.— This dressing is very nice with the oil omitted.

## 87. Cream Dressing, No. 1

½ cup evaporated milk
1 teaspoon sugar
¼ teaspoon salt
1 lemon

Beat milk, add sugar, salt, then lemon juice. Beat well. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 31 | 87 | 82 | 200 | 15 | 44 | 41 |
| In one serving: | | | | | | |
| 5 | 15 | 14 | 34 | 15 | 44 | 41 |

## 88. Cream Dressing, No. 2

½ cup thick cream
1 egg yolk
Juice of 2 lemons
1 teaspoon sugar
½ teaspoon salt

Boil the yolk for twenty minutes, or until quite mealy. Break up with a fork and add to cream. Press through

a fine sieve. Add sugar and salt; last of all, add the lemon juice, a few drops at a time, beating the cream with a fork. If the cream is thin, add two tablespoons evaporated milk; or all evaporated milk may be used instead of cream. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 7 | 477 | 70 | 554 | 1 | 86 | 13 |
| In one serving: | | | | | | |
| 1 | 79 | 12 | 92 | 1 | 86 | 13 |

### 89. Golden Dressing

2 eggs
¼ cup sugar
¼ cup lemon juice
¼ cup light-colored fruit juice (orange, apple, or pineapple)

Beat the eggs slightly to blend, but not until foamy, and add fruit juice, lemon juice, and sugar. Stir constantly in a double boiler until it begins to thicken. Cool and serve. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 50 | 100 | 260 | 410 | 12 | 24½ | 63½ |
| In one serving: | | | | | | |
| 8 | 16 | 44 | 68 | 12 | 24½ | 63½ |

## (H) DESSERTS

### 90. Cereal Pudding

1 cup cooked oatmeal or other left-over cereal
½ cup Karo sirup
½ cup nuts
1 egg, or more if desired

Put all together in a double boiler; when smooth, turn into an oiled pan and bake three fourths of an hour. Serve with lemon sauce. Number of servings, 6.

Calories in recipe without sauce:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 93 | 432 | 604 | 1,129 | 8 | 38 | 54 |
| In one serving: | | | | | | |
| 15 | 72 | 101 | 188 | 8 | 38 | 54 |

## 91. Lemon Sauce ("Vegetarian Cookbook," E. G. Fulton)

1 cup sugar
1 egg
1 lemon
¾ cup boiling water

Put grated rind and the juice of lemon with the sugar; add the beaten egg; add the boiling water just before serving. Cook slowly; do not boil. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 25 | 50 | 855 | 930 | 3 | 5 | 92 |
| In one serving: | | | | | | |
| 4 | 8 | 143 | 155 | 3 | 5 | 92 |

## 92. Farina Mold ("Manual of Recipes," Washington Sanitarium)

4 cups water
1 cup farina or cream of wheat
½ cup sugar
Pinch of salt
Flavoring as desired

Cook farina one hour in double boiler, add sugar, salt, and flavoring. Pour into molds, chill, serve with fruit juice. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 57 | 17 | 820 | 894 | 6 | 2 | 92 |
| In one serving: | | | | | | |
| 9 | 3 | 137 | 149 | 6 | 2 | 92 |

## 93. Fruit Sauce

1 cup red fruit juice
⅓ cup sugar
¼ cup lemon juice
Cornstarch

Heat fruit juice and lemon together, add sugar, and thicken with cornstarch. Number of servings, 6.

| Calories in recipe: | | | | | | |
|---|---|---|---|---|---|---|
| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
| .. | .. | 520 | 520 | .. | .. | 100 |
| In one serving: | | | | | | |
| .. | .. | 87 | 87 | .. | .. | 100 |

### 94. Cornstarch Pudding (without milk)

1 quart water
3 tablespoons cornstarch
Salt
1 cup sugar
3 eggs
Flavoring as desired

Put one quart of boiling water in double boiler, add the cornstarch rubbed smooth. Salt to taste. Cook until clear. Add sugar, remove from fire, beat in quickly the well-beaten yolk, add the whites beaten stiff. Beat well, add flavoring. Number of servings, 12.

| Calories in recipe: | | | | | | |
|---|---|---|---|---|---|---|
| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
| 75 | 150 | 954 | 1,179 | 6 | 12 | 82 |
| In one serving: | | | | | | |
| 6 | 12 | 80 | 98 | 6 | 12 | 82 |

### 95. Stuffed Prunes

Wash thoroughly, remove pit. Put in place of pit an almond or one half a walnut. Roll in powdered sugar if desired.

| Calories in one prune if large: | | | | | | |
|---|---|---|---|---|---|---|
| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
| 3 | 13 | 25 | 41 | 7 | 32 | 61 |

### 96. Prune Whip

2 cups prune purée
2 eggs
½ cup nuts
1 tablespoon sugar, or as desired
Flavoring as desired

Add the yolks and nuts to the prune purée, flavor, and sweeten, stir well, then fold in the beaten whites of the

eggs, reserving enough of the latter with which to garnish. Number of servings, 10.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 111 | 498 | 621 | 1,230 | 8 | 41 | 51 |
| In one serving: | | | | | | |
| 11 | 50 | 62 | 123 | 8 | 41 | 51 |

Calories in recipe if nuts are omitted:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 63 | .. | 587 | 650 | 10 | .. | 90 |
| In one serving: | | | | | | |
| 6 | .. | 59 | 65 | 10 | .. | 90 |

### 97. Strawberry Fluff ("Vegetarian Cookbook," E. G. Fulton)

2 egg whites
1 pint strawberries
¾ cup sugar

Mash strawberries with the sugar and add to the unbeaten whites. Beat until light and foamy. Number of servings, 6.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 64 | 20 | 734 | 818 | 8 | 2 | 90 |
| In one serving: | | | | | | |
| 11 | 3 | 122 | 136 | 8 | 2 | 90 |

### 98. Banana Snow ("Food and Cookery," Anderson)

½ cup banana pulp
2 teaspoons lemon juice
1 tablespoon sugar or honey
A few drops vanilla
1 egg white

Mix and beat with wire egg whip until very light. Put on a sauce dish. Garnish with red strawberries or jelly. Number of servings, 2.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 30 | 5 | 148 | 183 | 16 | 3 | 81 |
| In one serving: | | | | | | |
| 15 | 2½ | 74 | 91 | 16 | 3 | 81 |

### 99. Vegetable Gelatin (Agar-agar)

How to prepare vegetable jelly: Soak one ounce vegetable gelatin in warm water for an hour. Drain and add to one quart of boiling water. Let boil about ten minutes, or until clear. Strain through a cheesecloth, and it is ready to use. It is much to be preferred to animal gelatin.

### 100. Orange Jelly ("Food and Cookery," Anderson)

| | |
|---|---|
| 1¼ cups orange juice | 3 tablespoons lemon juice |
| ⅓ cup water | 1 cup vegetable jelly (see above) |
| ½ cup sugar | |

Mix all cold ingredients, and add the vegetable jelly. Mix well and pour into molds. Add a few thin slices of orange. When cold, serve with a little red fruit juice around each mold. Number of servings, 6.

| Calories in recipe: Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| .. | .. | 585 | 585 | .. | .. | 100 |
| In one serving: | | | | | | |
| .. | .. | 97 | 97 | .. | .. | 100 |

### 101. Fruit Mold

| | |
|---|---|
| 1¾ cups berry or other fruit juice, sweetened to taste | 3 tablespoons lemon juice |
| | 1 cup vegetable jelly |

Mix and pour into molds immediately. Number of servings, 6.

| Calories in recipe: Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| .. | .. | 355 | 355 | .. | .. | 100 |
| In one serving: | | | | | | |
| .. | .. | 59 | 59 | .. | .. | 100 |

NOTE.— Nuts, sliced fruit, raisins, etc., may be added to this recipe, making a very delightful variation.

### 102. Cake Without Baking Powder

| | |
|---|---|
| 4 eggs | 1 cup sifted flour |
| 1 cup sugar | 1 teaspoon lemon juice |

Pinch of salt

Separate eggs, add one half of the sugar to the yolks, lemon juice, and salt. Beat until foamy and the sugar is dissolved. Then beat whites until stiff and add the other half of the sugar to the whites. Beat, add the yolk mixture to the white mixture, folding them into each other. Then fold in the flour very carefully. Bake twenty minutes in a slow oven. Number of servings, 16.

| Calories in recipe: Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 163 | 215 | 1,280 | 1,658 | 10 | 13 | 77 |
| In one serving: | | | | | | |
| 10 | 13 | 80 | 103 | 10 | 13 | 77 |

NOTE.— The above may be used as a basis for nut or layer cake.

### 103. Cake Without Sugar

| | |
|---|---|
| 1 cup pitted dates | 1 cup zwieback crumbs |
| 1 cup shelled walnuts | ½ cup water |

Put the dates, walnuts, and crumbs through a food grinder, add the water, mix thoroughly and press firmly into a pan. Let it stand twelve hours. Slice and serve. Number of servings, 12.

| Calories in recipe: Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 131 | 822 | 897 | 1,850 | 7 | 44 | 49 |
| In one serving: | | | | | | |
| 11 | 68 | 75 | 154 | 7 | 44 | 49 |

### 104. Hot Malted Nuts

Place two tablespoons malted nuts in a cup, add slowly boiling water, stirring well. Serve.

Calories in one cup:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 27 | 73 | 50 | 150 | 18 | 49 | 33 |

## 105. Peanut Milk

| | |
|---|---|
| 1 tablespoon peanut butter | ⅓ teaspoon honey |

Emulsify peanut butter, adding water gradually up to 6 ounces. As the water is being added, stir in the honey.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 17 | 62 | 18 | 97 | 18 | 64 | 18 |

## 106. Cocoanut Drop Cakes

| | |
|---|---|
| 2 egg whites | ½ cup shredded cocoanut |
| ½ cup sugar | 2½ cups corn flakes |

Add salt to egg whites and beat stiff. Add sugar gradually, beating well. Then carefully fold in the corn flakes and the cocoanut. Drop from a spoon onto oiled pan and bake one-half hour in a slow oven. Number of drop cakes, 10.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 142 | 290 | 1,144 | 1,576 | 9 | 18 | 73 |
| In one drop cake: | | | | | | |
| 14 | 29 | 114 | 157 | 9 | 18 | 73 |

## 107. Caramel Pudding (Mrs. W. D. Gibson, of Pasadena Study Club)

| | |
|---|---|
| 2 cups brown sugar | ½ cup nuts |
| 2 cups water | Pinch of salt |
| 2 tablespoons cornstarch | 1 teaspoon vanilla |

Add sugar to water, boil five minutes, and thicken with cornstarch. When thick, add nuts and pour into molds to cool. Serve with whipped cream or any other pudding sauce desired. Number of servings, 10.

Calories in recipe:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 53 | 465 | 966 | 1,484 | 4 | 31 | 65 |
| In one serving: | | | | | | |
| 5 | 46 | 97 | 148 | 4 | 31 | 65 |

### 108. Baked Bananas

Select ripe, firm bananas. Bake in the skins in a slow oven until tender. May be used as a vegetable.

Calories:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 6 | 7 | 123 | 136 | 4 | 5 | 91 |

### 109. Banana Croquettes

Peel and scrape the banana; roll in an egg, beaten and mixed with four tablespoons of milk. Then roll in sifted bread crumbs. Brown in skillet or bake in oven. May be served as a vegetable.

Calories:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 12 | 18 | 120 | 150 | 8 | 12 | 80 |

### 110. Fruit Eggnog

1 egg

⅓ glass (or more) of strawberry or other fruit juice

Beat egg separately. Carefully fold the fruit juice into the white, then fold in the yolk, and cap with a strawberry or bit of jelly.

Calories in one eggnog:

| Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo. |
|---|---|---|---|---|---|---|
| 25 | 50 | 30 | 105 | 24 | 48 | 28 |

# TABLE I. CALORIC VALUE OF READY-TO-SERVE FOODS [1]

## Breads and Cereals

| Food | Amount | Weight | Protein | Fat | Carbohydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbohydrate |
|---|---|---|---|---|---|---|---|---|---|
| Barley, pearled | 2 hp. tbsp. | 3⅓ oz. | 8 | 2 | 65 | 75 | 10 | 3 | 87 |
| Biscuit, Uneeda | 1 biscuit | ⅛ oz. | 2 | 5 | 18 | 25 | 8 | 20 | 72 |
| Biscuits, soda or baking pwdr. | 1 small | 1 oz. | 9 | 8 | 58 | 75 | 12 | 10 | 78 |
| Bread, corn | small sq. | 1 oz. | 12 | 16 | 72 | 100 | 12 | 16 | 72 |
| Bread, Graham | 1 slice | 1⅓ oz. | 14 | 6 | 80 | 100 | 14 | 6 | 80 |
| Bread, rye | 1 slice | 1⅓ oz. | 14 | 4 | 82 | 100 | 14 | 4 | 82 |
| Bread, white | 1 slice | 1⅓ oz. | 13 | 6 | 81 | 100 | 13 | 6 | 81 |
| Bread, whole-wheat | 1 slice | 1⅓ oz. | 17 | 4 | 85 | 106 | 16 | 4 | 80 |
| Buns, cinnamon | 1 bun | 1½ oz. | 16 | 29 | 105 | 150 | 11 | 19 | 70 |
| Buns, plain | 1 bun | 1⅓ oz. | 12 | 10 | 78 | 100 | 12 | 10 | 78 |
| Crackers, Graham | 1 cracker | ¼ oz. | 3 | 7 | 25 | 35 | 9 | 20 | 71 |
| Crackers, oatmeal | 1 cracker | ¼ oz. | 4 | 8 | 23 | 35 | 11 | 23 | 66 |
| Corn flakes | 2 hp. tbsp. | ½ oz. | 4 | 1 | 33 | 38 | 11 | 1 | 88 |
| Cornmeal | 2 hp. tbsp. | 3⅓ oz. | 7 | 9 | 64 | 80 | 9 | 11 | 80 |
| Gluten mush | 2 hp. tbsp. | 3⅓ oz. | 11 | 1 | 49 | 61 | 18 | 1 | 81 |
| Granola | 2 hp tbsp. | 1⅓ oz. | 20 | 1 | 113 | 134 | 15 | 1 | 84 |
| Granuto | 2 hp. tbsp. | 1⅓ oz. | 26 | 6 | 122 | 154 | 17 | 4 | 79 |
| Grape-nuts | 2 hp. tbsp. | 1⅓ oz. | 17 | 47 | 112 | 176 | 10 | 27 | 63 |

[1] As a basis for the estimation of the food values in Tables I and II, reference has been made to Government Bulletin No. 28, "Chemical Composition of American Foods;" to the Battle Creek Sanitarium Diet List; to Pattee's "Practical Dietetics;" and to Locke's "Food Values." Much personal work in weighing and measuring has also been done. The values in Table I are for foods as ordinarily prepared and served, except in the case of cooked vegetables; the value of each of these being computed for the vegetable cooked plain without the addition of milk, cream, or fat of any kind. The housewife may easily estimate the caloric value of any seasoning that she may add. The percentages given are **of the total food value and not of the weight.** Obviously, from the very nature of the question in hand, these figures cannot be absolutely accurate, but their approximation is sufficiently close to serve all practical purposes. Fractions and decimals have been, for the most part, disregarded.

| Food | Amount | Weight | Protein | Fat | Carbo-hydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo-hydrate |
|---|---|---|---|---|---|---|---|---|---|
| Granose biscuit | 2 biscuits | 1 oz. | 14 | 2 | 84 | 100 | 14 | 2 | 84 |
| Griddle cakes (buckwheat) | 1 cake | 3 oz. | 12 | 12 | 116 | 140 | 9 | 9 | 82 |
| Gruel, cracked wheat | ⅔ cup | 5 oz. | 16 | 30 | 42 | 88 | 18 | 34 | 48 |
| Gruel, gluten | ⅔ cup | 5 oz. | 24 | 23 | 71 | 118 | 20 | 19 | 61 |
| Gruel, oatmeal | ⅔ cup | 5 oz. | 17 | 35 | 40 | 92 | 19 | 38 | 43 |
| Hominy | 2 hp. tbsp. | 3⅓ oz. | 9 | 2 | 73 | 84 | 11 | 2 | 87 |
| Hominy grits | 2 hp. tbsp. | 3⅓ oz. | 6 | 2 | 50 | 58 | 10 | 3 | 87 |
| Krumbles | 2 hp. tbsp. | ⅔ oz. | 7 | 3 | 59 | 69 | 11 | 4 | 85 |
| Oatmeal | 2 hp. tbsp. | 4 oz. | 14 | 5 | 56 | 75 | 19 | 7 | 74 |
| Rice biscuit | 2 biscuits | 1 oz. | 8 | 1 | 97 | 106 | 8 | 1 | 91 |
| Rice flakes | 2 hp. tbsp. | ½ oz. | 4 | 1 | 48 | 53 | 8 | 1 | 91 |
| Rice, polished | 2 hp. tbsp. | 3⅓ oz. | 12 | 2 | 114 | 128 | 9 | 1 | 90 |
| Rice, puffed | 2 hp. tbsp. | ⅓ oz. | 4 | .. | 31 | 35 | 9 | 1 | 90 |
| Rice, whole (brown) | 2 hp. tbsp. | 4 oz. | 30 | 5 | 142 | 177 | 16 | 3 | 81 |
| Shredded-wheat biscuit | 1 biscuit | 1 oz. | 15 | 3 | 91 | 109 | 14 | 3 | 83 |
| Taploca | 2 hp. tbsp. | 2 oz. | 3 | 1 | 52 | 56 | 5 | 2 | 93 |
| Wheat, cracked | 2 hp. tbsp. | 4 oz. | 14 | 4 | 86 | 104 | 14 | 4 | 82 |
| Wheat, cream of | 2 hp. tbsp. | 3⅓ oz. | 7 | 2 | 47 | 56 | 12 | 4 | 84 |
| Wheat flakes | 2 hp. tbsp. | ½ oz. | 7 | 1 | 41 | 49 | 13 | 2 | 85 |
| Wheat grits | 2 hp. tbsp. | 3⅓ oz. | 7 | 3 | 51 | 61 | 12 | 5 | 83 |
| **Dairy Dishes** | | | | | | | | | |
| Butter | 1 pat or 1 lev. tbsp. | ½ oz. | .. | 114 | .. | 114 | .. | 100 | .. |
| Buttermilk | aver. serv. | 6 oz. | 23 | 8 | 35 | 66 | 34 | 12 | 54 |

| Food | Amount | Weight | Protein | Fat | Carbo-hydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo-hydrate |
|---|---|---|---|---|---|---|---|---|---|
| Cheese, American pale ...... | 1½ cu. in. | 1 oz. | 25 | 72 | 2 | 100 | 25 | 73 | 2 |
| Cheese, cottage ............ | 2 hp. tbsp. | 3 oz. | 60 | 38 | 15 | 113 | 53 | 33 | 14 |
| Cheese, full cream ......... | 1 cu. in. | ⅔ oz. | 20 | 54 | .. | 74 | 27 | 73 | .. |
| Cheese, Neufchâtel ......... | 1 cu. in. | ⅔ oz. | 15 | 50 | 1 | 66 | 23 | 76 | 1 |
| Cheese, Swiss .............. | 1 slice | 1 oz. | 33 | 96 | 1 | 130 | 25 | 74 | 1 |
| Cream, average ............. | 1 tbsp. | ½ oz. | 2 | 25 | 3 | 30 | 5 | 85 | 10 |
| Cream, rich (40-per-cent) ... | 1 tbsp. | ½ oz. | 1 | 54 | 2 | 57 | 2 | 95 | 3 |
| Eggs ...................... | 1 large | 1½ oz. | 25 | 50 | .. | 75 | 33 | 67 | .. |
| Milk, evaporated unsweetened | ½ glass | 4 oz. | 30 | 85 | 45 | 160 | 19 | 52 | 29 |
| Milk, skim ................ | aver. serv. | 6 oz. | 24 | 5 | 36 | 65 | 37 | 8 | 55 |
| Milk, whole ............... | aver. serv. | 6 oz. | 22 | 64 | 34 | 120 | 19 | 52 | 29 |
| Yogurt made from skim milk | aver. serv. | 6 oz. | 24 | 5 | 36 | 65 | 37 | 7 | 56 |

For soups and salads, see Chapter XXXI.

## Meats and Fish

| Food | Amount | Weight | Protein | Fat | Carbo-hydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo-hydrate |
|---|---|---|---|---|---|---|---|---|---|
| Bacon, fried ............... | 1 slice | ½ oz. | 13 | 57 | .. | 70 | 19 | 81 | .. |
| Bacon, smoked, uncooked .... | 1 slice | 1 oz. | 12 | 178 | .. | 190 | 6 | 94 | .. |
| Beef, boiled, lean ......... | aver. serv. | 3 oz. | 123 | 14 | .. | 137 | 89 | 11 | .. |
| Beef, roast, fat ........... | aver. serv. | 3 oz. | 54 | 410 | .. | 464 | 12 | 88 | .. |
| Beefsteak, round ........... | aver. serv. | 3 oz. | 112 | 72 | .. | 184 | 61 | 39 | .. |
| Beefsteak, tenderloin ...... | aver. serv. | 3 oz. | 97 | 189 | .. | 286 | 34 | 66 | .. |
| Bouillon .................. | aver. serv. | 5 oz. | 12 | 1.5 | 1.5 | 15 | 80 | 10 | 10 |
| Chicken, broilers .......... | aver. serv. | 6 oz. | 152 | 48 | .. | 200 | 76 | 24 | .. |
| Chicken, roast ............. | aver. serv. | 3 oz. | 132 | 41 | .. | 173 | 76 | 24 | .. |
| Clams ..................... | aver. serv. | 4 oz. | 30 | 4 | .. | 34 | 88 | 12 | .. |

| Food | Amount | Weight | Protein | Fat | Carbo-hydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo-hydrate |
|---|---|---|---|---|---|---|---|---|---|
| Codfish | aver. serv. | 5 oz. | 99 | 5 | .. | 104 | 95 | 5 | .. |
| Goose | aver. serv. | 3 oz. | 54 | 285 | .. | 339 | 16 | 84 | .. |
| Haddock | aver. serv. | 3 oz. | 95 | 5 | .. | 100 | 95 | 5 | .. |
| Halibut | aver. serv. | 3 oz. | 65 | 41 | .. | 106 | 61 | 39 | .. |
| Ham, boiled | aver. serv. | 2 oz. | 51 | 131 | .. | 182 | 28 | 72 | .. |
| Ham, fried | aver. serv. | 2 oz. | 65 | 73 | .. | 138 | 47 | 53 | .. |
| Lamb chop, boiled | aver. serv. | 2 oz. | 50 | 160 | .. | 210 | 24 | 76 | .. |
| Lamb, leg roast | aver. serv. | 3 oz. | 67 | 100 | .. | 167 | 40 | 60 | .. |
| Liver | aver. serv. | 3 oz. | 65 | 42 | .. | 107 | 61 | 39 | .. |
| Lobster | aver. serv. | 2 oz. | 38 | 10 | .. | 48 | 80 | 20 | .. |
| Mutton chop | aver. serv. | 3 oz. | 100 | 50 | .. | 150 | 67 | 33 | .. |
| Mutton leg, boiled | aver. serv. | 2½ oz. | 72 | 135 | .. | 207 | 34 | 66 | .. |
| Oysters | aver. serv. | 3 oz. | 21 | 10 | .. | 31 | 68 | 32 | .. |
| Salmon | aver. serv. | 2 oz. | 40 | 83 | .. | 123 | 32 | 68 | .. |
| Sausage | 1 sausage | 1 oz. | 20 | 144 | .. | 164 | 12 | 88 | .. |
| Shad | aver. serv. | 2 oz. | 44 | 51 | .. | 95 | 45 | 55 | .. |
| Trout | aver. serv. | 2 oz. | 44 | 111 | .. | 155 | 28 | 72 | .. |
| Turkey | aver. serv. | 2 oz. | 48 | 118 | .. | 166 | 29 | 71 | .. |
| Veal | aver. serv. | 2½ oz. | 75 | 25 | .. | 100 | 75 | 25 | .. |
| **Vegetables and Legumes** | | | | | | | | | |
| Asparagus | 8 stalks | 4 oz. | 8 | 3 | 14 | 25 | 32 | 12 | 56 |
| Beans, Lima, green | 2 hp. tbsp. | 2½ oz. | 12 | 2 | 42 | 56 | 21 | 4 | 75 |
| Beans, Lima, dried | 2 hp. tbsp. | 2½ oz. | 24 | 5 | 86 | 115 | 21 | 4 | 75 |
| Beans, navy, baked | 2 hp. tbsp. | 4 oz. | 37 | 8 | 105 | 150 | 25 | 5 | 70 |

| Food | Amount | Weight | Protein | Fat | Carbo-hydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo-hydrate |
|---|---|---|---|---|---|---|---|---|---|
| Beans, navy, boiled ......... | 2 hp. tbsp. | 2⅓ oz. | 19 | 3 | 50 | 72 | 25 | 5 | 70 |
| Beans, pink or kidney ....... | 2 hp. tbsp. | 2⅓ oz. | 18 | 2 | 47 | 67 | 27 | 3 | 70 |
| Beans, soy ................ | 2 hp. tbsp. | 2 oz. | 32 | 41 | 27 | 100 | 32 | 41 | 27 |
| Beans, string .............. | 2 hp. tbsp. | 2 oz. | 4 | 1 | 5 | 10 | 40 | 10 | 50 |
| Beets ..................... | 2 hp. tbsp. | 2½ oz. | 7 | 1 | 21 | 29 | 24 | 3 | 73 |
| Beet greens ................ | 2 hp. tbsp. | 3 oz. | 9 | 10 | 13 | 32 | 28 | 3 | 69 |
| Cabbage, chopped, raw ...... | 2 hp. tbsp. | 1 oz. | 5 | 2 | 3 | 10 | 50 | 20 | 30 |
| Cabbage, cooked ............ | 2 hp. tbsp. | 2 oz. | 2 | 1 | 1 | 4 | 50 | 20 | 30 |
| Carrots .................... | 2 hp. tbsp. | 2 oz. | 2 | 1 | 10 | 13 | 14 | 10 | 76 |
| Cauliflower ................ | 2 hp. tbsp. | 4 oz. | 4.5 | 1 | 2.5 | 8 | 55 | 12 | 33 |
| Celery .................... | 3 stalks | 2 oz. | 5 | 1 | 14 | 20 | 24 | 5 | 71 |
| Corn, canned .............. | 2 hp. tbsp. | 3 oz. | 11 | 11 | 78 | 100 | 11 | 11 | 78 |
| Corn, green ............... | 1 ear | 3 oz. | 13 | 10 | 77 | 100 | 13 | 10 | 77 |
| Cucumber .................. | aver. serv. | 2 oz. | 2 | 1 | 7 | 10 | 20 | 10 | 70 |
| Eggplant .................. | 1 slice | 1½ oz. | 2.5 | 1.5 | 8 | 12 | 21 | 12 | 67 |
| Lentils .................... | 2 hp. tbsp. | 2 oz. | 18 | 1 | 48 | 67 | 27 | 1 | 72 |
| Lettuce .................... | aver. serv. | 1 oz. | 1.5 | .5 | 4 | 6 | 25 | 14 | 61 |
| Mushrooms ................. | 2 large | 1½ oz. | 7 | 2 | 12 | 21 | 33 | 11 | 56 |
| Onion ..................... | one | 3 oz. | 5 | 3 | 32 | 40 | 12 | 8 | 80 |
| Parsnips .................. | 2 hp. tbsp. | 3 oz. | 1 | 1 | 7 | 9 | 10 | 10 | 80 |
| Peas, dried, cooked ......... | 2 hp. tbsp. | 2 oz. | 28 | 2 | 70 | 100 | 28 | 2 | 70 |
| Peas, green ................ | 2 hp. tbsp. | 2 oz. | 14 | 2 | 41 | 57 | 25 | 3 | 72 |
| Potatoes, baked ............. | average | 3 oz. | 10 | 1 | 89 | 100 | 10 | 1 | 89 |
| Potatoes, boiled in skins .... | aver. serv. | 3 oz. | 10 | 1 | 89 | 100 | 10 | 1 | 89 |

| Food | Amount | Weight | Protein | Fat | Carbo-hydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo-hydrate |
|---|---|---|---|---|---|---|---|---|---|
| Potatoes, mashed | 2 hp. tbsp. | 3⅓ oz. | 10 | 26 | 70 | 106 | 9 | 25 | 66 |
| Potatoes, sweet | average | 3⅓ oz. | 12 | 19 | 175 | 206 | 6 | 9 | 85 |
| Radishes | 5 large | 2½ oz. | 2 | 1 | 10 | 13 | 18 | 3 | 79 |
| Spinach | 2 hp. tbsp. | 3 oz. | 8 | 6 | 11 | 25 | 35 | 24 | 41 |
| Squash, Hubbard | 2 hp. tbsp. | 3 oz. | 3 | 4 | 36 | 43 | 8 | 9 | 83 |
| Tomatoes | 1 medium | 5 oz. | 7 | 2 | 24 | 33 | 21 | 7 | 72 |
| Turnips | 2 hp. tbsp. | 4 oz. | 2 | 1 | 4 | 7 | 20 | 10 | 70 |
| Vegetable oysters, creamed | 2 hp. tbsp. | 2 oz. | 4 | 24 | 12 | 40 | 10 | 60 | 30 |
| **Fruits, Fresh** | | | | | | | | | |
| Apple | average | 3½ oz. | 2 | 4 | 54 | 60 | 3 | 7 | 90 |
| Apricot | average | 1 oz | 1.5 | 1 | 20.5 | 23 | 6.5 | 4.5 | 89 |
| Banana | average | 3½ oz. | 7 | 6 | 87 | 100 | 7 | 6 | 87 |
| Blackberries | 2 hp. tbsp. | 2⅓ oz. | 3 | 6 | 30 | 39 | 6 | 15 | 79 |
| Cantaloupe | ½ melon | ½ lb. | 6 | .. | 87 | 93 | 6 | .. | 94 |
| Cherries | aver. serv. | 3 oz. | 3 | 5 | 49 | 57 | 5 | 8 | 87 |
| Currants | 2 hp. tbsp. | 2 oz. | 3 | .. | 30 | 33 | 9 | .. | 91 |
| Figs | 1 large | 1 oz. | 3 | .. | 57 | 60 | 5 | .. | 95 |
| Gooseberries | 2 hp. tbsp. | 1⅔ oz. | 1 | .. | 24 | 25 | 4 | .. | 96 |
| Grapefruit | ½ large | 8 oz. | 7 | 4 | 89 | 100 | 7 | 4 | 89 |
| Grapes | 1 bunch | 5 oz. | 5 | 10 | 85 | 100 | 5 | 10 | 85 |
| Huckleberries | 2 hp. tbsp. | 1½ oz. | 1 | 3 | 34 | 38 | 3 | 8 | 89 |
| Lemon | average | 2 oz. | 2 | 3 | 15 | 20 | 9 | 15 | 76 |
| Orange | average | 6 oz. | 5 | 2 | 69 | 76 | 7 | 3 | 90 |
| Peach | average | 3 oz. | 3 | 1 | 36 | 40 | 7 | 2 | 91 |

| Food | Amount | Weight | Protein | Fat | Carbo-hydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo-hydrate |
|---|---|---|---|---|---|---|---|---|---|
| Pear | average | 4 oz. | 4 | 6 | 80 | 90 | 4 | 7 | 89 |
| Pineapple | 2 slices | 2 oz. | 1 | 1 | 15 | 17 | 5 | 6 | 89 |
| Plum | average | 1 oz. | 2 | .. | 27 | 29 | 6 | .. | 94 |
| Raspberries, black | 2 hp. tbsp. | 2 oz. | 4 | 5 | 27 | 36 | 10 | 13 | 77 |
| Raspberries, red | 2 hp. tbsp. | 2 oz. | 2 | .. | 30 | 32 | 7 | .. | 93 |
| Strawberries | 2 hp. tbsp. | 2⅓ oz. | 3 | 4 | 23 | 30 | 10 | 12 | 73 |
| Watermelon | 1 slice | 10 oz. | 5 | 5 | 70 | 80 | 6 | 6 | 88 |
| **Fruits, Dried** | | | | | | | | | |
| Apricots | one | ⅓ oz. | 1.5 | 1 | 20.5 | 23 | 6.5 | 4.5 | 89 |
| Dates | one | ⅓ oz. | .5 | 2 | 24 | 26.5 | 2 | 8 | 90 |
| Figs | one | ½ oz. | 3 | 1 | 50 | 54 | 6 | 1 | 93 |
| Prunes | one | ⅓ oz. | 1 | .. | 24 | 25 | 4 | .. | 96 |
| Raisins | ten | ½ oz. | 2 | 4 | 44 | 50 | 4 | 8 | 88 |
| **Stewed Fruits, Fruit Juices, Jellies, etc.** | | | | | | | | | |
| Apple, baked | 1 large | 4 oz. | 2 | 5 | 118 | 125 | 1.5 | 4 | 94.5 |
| Apple juice | 1 glass | 6 oz. | .. | .. | 17 | 17 | .. | .. | 100 |
| Apple sauce | 2 hp. tbsp. | 4 oz. | 2 | 4 | 94 | 100 | 2 | 4 | 94 |
| Apricot sauce | 2 hp. tbsp. | 3 oz. | 4 | .. | 63 | 67 | 6 | .. | 94 |
| Blackberry juice | 1 glass | 6 oz. | .. | .. | 150 | 150 | .. | .. | 100 |
| Blackberry sauce | 2 hp. tbsp. | 2 oz. | 1 | 6 | 60 | 67 | 2 | 8 | 90 |
| Cherry sauce | 2 hp. tbsp. | 2 oz. | 3 | 4 | 60 | 67 | 4 | 6 | 90 |
| Cranberry sauce | 2 hp. tbsp. | 3 oz. | 1 | 3 | 146 | 150 | 1 | 2 | 97 |
| Currant jelly | 1 hp. tbsp. | 1 oz. | 1 | .. | 99 | 100 | 1 | .. | 99 |

| Food | Amount | Weight | Protein | Fat | Carbo-hydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo-hydrate |
|---|---|---|---|---|---|---|---|---|---|
| Lemonade | 1 glass | 6 oz. | .. | .. | 85 | 85 | .. | .. | 100 |
| Lemon juice | 1 tbsp. | ½ oz. | .. | .. | 5 | 5 | .. | .. | 100 |
| Orange juice | 1 glass | 6 oz. | .. | .. | 90 | 90 | .. | .. | 100 |
| Orange marmalade | 1 hp. tbsp. | 1 oz. | 1 | .. | 99 | 100 | 1 | .. | 99 |
| Peach juice | 1 glass | 6 oz. | .. | .. | 120 | 120 | .. | .. | 100 |
| Peach sauce | 2 hp. tbsp. | 3 oz. | 2 | 1 | 57 | 60 | 4 | 1 | 95 |
| Pear juice | 1 glass | 6 oz. | .. | .. | 150 | 150 | .. | .. | 100 |
| Pear sauce | 2 hp. tbsp. | 2 oz. | 1 | 2 | 47 | 50 | 2 | 4 | 94 |
| Plum juice | 1 glass | 6 oz. | .. | .. | 150 | 150 | .. | .. | 100 |
| Plum sauce | 2 hp. tbsp. | 2 oz. | .. | .. | 70 | 70 | .. | .. | 100 |
| Prune marmalade | 2 hp. tbsp. | 2¼ oz. | 2 | 1 | 97 | 100 | 2 | 1 | 97 |
| Raspberry juice, black | 1 glass | 6 oz. | .. | .. | 150 | 150 | .. | .. | 100 |
| Raspberry sauce, black | 2 hp. tbsp. | 2 oz. | 3 | .. | 50 | 53 | 6 | .. | 94 |
| Raspberry juice, red | 1 glass | 6 oz. | .. | .. | 120 | 120 | .. | .. | 100 |
| Raspberry sauce, red | 2 hp. tbsp. | 2 oz. | 2 | .. | 42 | 44 | 5 | .. | 95 |
| Strawberry juice | 1 glass | 6 oz. | .. | .. | 120 | 120 | .. | .. | 100 |
| Strawberry sauce | 2 hp tbsp. | 2 oz. | 1 | 1 | 48 | 50 | 2 | 2 | 96 |
| **Desserts and Sweets** | | | | | | | | | |
| Cake, chocolate layer | aver. serv. | 2½ oz. | 18 | 55 | 177 | 250 | 7 | 22 | 71 |
| Cake, coffee | aver. serv. | 2 oz. | 15 | 82 | 133 | 230 | 7 | 35 | 58 |
| Cake, fruit | aver. serv. | 1½ oz. | 11 | 44 | 116 | 171 | 6 | 23 | 71 |
| Cake, frosted | aver. serv. | 2 oz. | 14 | 48 | 150 | 212 | 6 | 23 | 71 |
| Cake, gingerbread | aver. serv. | 2 oz. | 14 | 50 | 156 | 220 | 6 | 23 | 71 |
| Cake, jelly roll | aver. serv. | 3 oz. | 17 | 28 | 256 | 301 | 6 | 9 | 85 |

| Food | Amount | Weight | Protein | Fat | Carbo-hydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo-hydrate |
|---|---|---|---|---|---|---|---|---|---|
| Cake, nut | aver. serv. | 2 oz. | 18 | 70 | 134 | 122 | 15 | 57 | 28 |
| Cake, sponge | aver. serv. | 1½ oz. | 19 | 21 | 143 | 183 | 10 | 11 | 79 |
| Chocolate cream | aver. size | ⅓ oz. | .5 | 1.5 | 33 | 35 | 1 | 4 | 95 |
| Chocolate, unsweetened | ........ | 1 oz. | 15 | 124 | 34 | 173 | 9 | 72 | 19 |
| Cocoa | 1 tbsp. | ¼ oz. | 12 | 37 | 21 | 70 | 17 | 53 | 30 |
| Custard | 2 hp. tbsp. | 3 oz. | 16 | 39 | 37 | 92 | 1[illegible] | 42 | 41 |
| Dates, stuffed | 1 | ⅓ oz. | 2 | 8 | 24 | 34 | 5 | 24 | 71 |
| Doughnuts | 1 | 2 oz. | 12 | 90 | 98 | 200 | 6 | 45 | 49 |
| Fruit mold | aver. serv. | 3 oz. | 1 | .. | 99 | 100 | 1 | .. | 99 |
| Honey | 1 tsp. | ¼ oz. | .. | .. | 25 | 25 | .. | .. | 100 |
| Ice cream | 2 hp. tbsp. | 3½ oz. | 25 | 100 | 75 | 200 | 12.5 | 50 | 37.5 |
| Junket | 1 cup | 7 oz. | 28 | 78 | 44 | 150 | 19 | 52 | 29 |
| Lady fingers | three | 1 oz. | 10 | 12 | 78 | 100 | 10 | 12 | 78 |
| Macaroons | 2 | 1 oz. | 6 | 33 | 61 | 100 | 6 | 33 | 61 |
| Molasses | ........ | 1 oz. | 3 | .. | 78 | 81 | 4 | .. | 96 |
| Pie, apple | ⅙ pie | 4 oz. | 16 | 114 | 220 | 350 | 5 | 33 | 62 |
| Pie, custard | ⅙ pie | 4 oz. | 25 | 80 | 145 | 250 | 10 | 3 | 87 |
| Pie, lemon | ⅙ pie | 4 oz. | 17 | 104 | 169 | 290 | 6 | 36 | 58 |
| Pie, mince | ⅙ pie | 4 oz. | 30 | 136 | 184 | 350 | 9 | 39 | 52 |
| Pie, pumpkin | ⅙ pie | 4 oz. | 25 | 105 | 120 | 250 | 10 | 42 | 48 |
| Pie, raisin | ⅙ pie | 4 oz. | 16 | 140 | 244 | 400 | 4 | 35 | 61 |
| Pudding, bread | 2 hp. tbsp. | 3 oz. | 15 | 40 | 145 | 200 | 7.5 | 20 | 72.5 |
| Pudding, brown Betty | aver. serv. | 4 oz. | 14 | 24 | 162 | 200 | 7 | 12 | 81 |
| Pudding, rice | 2 hp. tbsp. | 3 oz. | 13 | 66 | 60 | 139 | 9 | 48 | 43 |

| Food | Amount | Weight | Protein | Fat | Carbo-hydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo-hydrate |
|---|---|---|---|---|---|---|---|---|---|
| Pudding, tapioca | 2 hp. tbsp. | 3 oz. | 24 | 57 | 91 | 172 | 13 | 33 | 54 |
| Prune whip | 2 hp. tbsp. | 2 oz. | 6 | 10 | 59 | 75 | 8 | 13 | 79 |
| Sherbet | 2 tbsp. | 2 oz. | 5 | .. | 75 | 80 | 6 | .. | 94 |
| Sugar, granulated | 1 hp. tbsp. | ⅓ oz. | .. | .. | 40 | 40 | .. | .. | 100 |
| Sugar, loaf | 1 cube | ¼ oz. | .. | .. | 30 | 30 | .. | .. | 100 |
| Sugar, maple | small sq. | 1 oz. | .. | .. | 100 | 100 | .. | .. | 100 |
| Sirup, homemade | 1 tsp. | ¼ oz. | .. | .. | 25 | 25 | .. | .. | 100 |
| Sirup, maple | 1 tsp. | ¼ oz. | .. | .. | 25 | 25 | .. | .. | 100 |
| **Nuts** | | | | | | | | | |
| Almonds | 10 | 1 oz. | 27 | 146 | 6 | 179 | 15 | 82 | 3 |
| Brazil nuts | 3 | ½ oz. | 10 | 86 | 4 | 100 | 10 | 86 | 4 |
| Chestnuts | 10 | 1 oz. | 5 | 10 | 35 | 50 | 10 | 20 | 70 |
| Cocoanut, shredded | .. | 1 oz. | 7 | 156 | 37 | 200 | 3 | 78 | 19 |
| Filberts | 10 | ⅓ oz. | 7 | 62 | 6 | 75 | 9 | 83 | 8 |
| Pine nuts | 80 | ½ oz. | 22 | 74 | 4 | 100 | 22 | 74 | 4 |
| Peanuts | 15 | 1 oz. | 26 | 82 | 22 | 130 | 20 | 63 | 17 |
| Pecans | 10 | 1 oz. | 13 | 199 | 16 | 228 | 5 | 88 | 7 |
| Walnuts | 10 | 1½ oz. | 30 | 250 | 20 | 300 | 10 | 83 | 7 |
| **Miscellaneous** | | | | | | | | | |
| Coffee | 1 cup | 6 oz. | The food value is equivalent to milk, or cream, and sugar added. | | | | | | |
| Macaroni baked with cheese | 2 hp. tbsp. | 4⅔ oz. | 78 | 190 | 170 | 438 | 18 | 43 | 39 |
| Macaroni, boiled | 2 hp. tbsp. | 3⅓ oz. | 12 | 14 | 65 | 91 | 14 | 15 | 71 |
| Malted milk | 1 hp. tbsp. | ½ oz. | 9 | 11 | 40 | 60 | 15 | 18 | 67 |

| Food | Amount | Weight | Protein | Fat | Carbo-hydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo-hydrate |
|---|---|---|---|---|---|---|---|---|---|
| Malted nuts | 1 hp. tbsp. | 1 oz. | 28 | 74 | 51 | 153 | 18 | 48 | 34 |
| Meltose | 1 tbsp. | ⅔ oz. | .. | .. | 57 | 57 | .. | .. | 100 |
| Nut butter | 1 tbsp. | ½ oz. | 17 | 62 | 10 | 89 | 18 | 71 | 11 |
| Nuttolene | aver. serv. | 2 oz. | 29 | 55 | 16 | 100 | 29 | 55 | 16 |
| Olives | 5 | 1⅓ oz. | 5 | 85 | 10 | 100 | 5 | 85 | 10 |
| Protose | aver. serv. | 2 oz. | 46 | 32 | 20 | 98 | 47 | 33 | 20 |
| Tea | 1 cup | 6 oz. | The food value is equivalent to milk, or cream, and sugar added. | | | | | | |

# TABLE II

## Foodstuffs, Both Raw and Cooked, Commonly Used in Cooking

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Apples, diced | 1 cup | 2 oz. | 1.5 | 3 | 40.5 | 45 | 3 | 7 | 90 |
| Apples, dried | 1 cup | 3 oz. | 6 | 16 | 230 | 252 | 3 | 5 | 92 |
| Apricots, dried | 1 cup | 5 oz. | 26 | 13 | 362 | 401 | 6 | 3 | 91 |
| Arrowroot | 1 tbsp. | ½ oz. | .. | .. | 57 | 57 | .. | .. | 100 |
| Barley, crushed | 1 tbsp. | ½ oz. | 4 | 1 | 44 | 49 | 10 | 2 | 88 |
| Barley, pearled | 1 tbsp. | 1 oz. | 9 | 3 | 80 | 92 | 10 | 3 | 87 |
| Beans, Lima, dried, cooked | 1 cup | 7 oz. | 67 | 13 | 242 | 322 | 21 | 3 | 76 |
| Beans, Lima, dried, uncooked | 1 cup | 6 oz. | 122 | 24 | 466 | 612 | 21 | 4 | 75 |
| Beans, Lima, green, cooked | 1 cup | 8 oz. | 38 | 6 | 136 | 180 | 21 | 3 | 76 |
| Beans, Lima, mashed | 1 cup | 8 oz. | 76 | 15 | 276 | 367 | 21 | 3 | 76 |
| Beans, navy, cooked | 1 cup | 7 oz. | 56 | 10 | 150 | 216 | 25 | 5 | 70 |
| Beans, navy, mashed | 1 cup | 8 oz. | 64 | 11 | 171 | 246 | 25 | 5 | 70 |
| Beans, navy, uncooked | 1 cup | 6½ oz. | 171 | 31 | 451 | 653 | 25 | 5 | 70 |

| Food | Amount | Weight | Protein | Fat | Carbo-hydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo-hydrate |
|---|---|---|---|---|---|---|---|---|---|
| Beans, pink or kidney, cooked | 1 cup | 7 oz. | 56 | 4 | 140 | 200 | 28 | 2 | 70 |
| Beans, pink or kidney, mashed | 1 cup | 8 oz. | 66 | 4 | 173 | 243 | 28 | 2 | 70 |
| Beans, pink or kidney, uncook. | 1 cup | 7 oz. | 175 | 23 | 455 | 653 | 27 | 3 | 70 |
| Beans, soy, cooked .......... | 1 cup | 6½ oz. | 112 | 145 | 93 | 350 | 32 | 41 | 27 |
| Beans, string, cooked ....... | 1 cup | 6 oz. | 12 | 3 | 15 | 30 | 40 | 10 | 50 |
| Bran ...................... | 1 cup | 2½ oz. | 31 | 13 | 173 | 217 | 14 | 6 | 80 |
| Bread crumbs, dry .......... | 1 cup | 2½ oz. | 26 | 12 | 162 | 200 | 13 | 6 | 81 |
| Bread crumbs, moist ........ | 1 cup | 6 oz. | 35 | 16 | 215 | 266 | 13 | 6 | 81 |
| Butter ..................... | 1 tbsp. | ½ oz. | .. | 109 | .. | 109 | .. | 100 | .. |
| Butter ..................... | 1 cup | 8 oz. | .. | 1,744 | .. | 1,744 | .. | 100 | .. |
| Cabbage, raw, chopped ...... | 1 cup | 2 oz. | 9 | 3 | 6 | 18 | 50 | 20 | 30 |
| Carrots, grated or chopped .. | 1 cup | 4 oz. | 11 | 8 | 56 | 75 | 15 | 11 | 74 |
| Carrots, mashed ............ | 1 cup | 7 oz. | 7 | 7 | 36 | 50 | 14 | 10 | 76 |
| Celery, chopped ............ | 1 cup | 2 oz. | 7 | 1.5 | 21.5 | 30 | 24 | 5 | 71 |
| Cocoa ...................... | 1 tbsp. | ¼ oz. | 12 | 37 | 21 | 70 | 16 | 53 | 31 |
| Cocoanut, shredded ........ | ........ | 1 oz. | 6 | 135 | 32 | 173 | 3 | 78 | 19 |
| Corn, canned ............... | 1 cup | 8 oz. | 30 | 30 | 200 | 260 | 11 | 11 | 78 |
| Cornmeal, cooked ........... | 1 cup | 8 oz. | 17 | 22 | 161 | 200 | 9 | 11 | 80 |
| Cornmeal, uncooked ......... | 1 tbsp. | ⅓ oz. | 3 | 2 | 28 | 33 | 10 | 5 | 85 |
| Cornmeal, uncooked ......... | 1 cup | 3 oz. | 52 | 23 | 427 | 502 | 10 | 5 | 85 |
| Cornstarch ................. | 1 tbsp. | ½ oz. | .. | .. | 38 | 38 | .. | .. | 100 |
| Cornstarch ................. | 1 cup | 5½ oz. | .. | .. | 790 | 790 | .. | .. | 100 |
| Cottage cheese ............. | 1 cup | 6 oz. | 120 | 76 | 30 | 226 | 53 | 33 | 14 |
| Cracker crumbs ............ | 1 cup | 5 oz. | 66 | 81 | 440 | 587 | 11 | 14 | 75 |
| Cranberries, raw .......... | 1 cup | 4 oz. | 2 | .. | 18 | 20 | 10 | .. | 90 |

| Food | Amount | Weight | Protein | Fat | Carbo-hydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo-hydrate |
|---|---|---|---|---|---|---|---|---|---|
| Cream, average (16-per-cent) | 1 cup | 8 oz. | 24 | 408 | 48 | 480 | 5 | 85 | 10 |
| Cream, heavy (40-per-cent) . | 1 cup | 8 oz. | 15 | 854 | 30 | 899 | 2 | 95 | 3 |
| Crisco .................... | 1 cup | 8 oz. | .. | 2,160 | .. | 2,160 | .. | 100 | .. |
| Cucumber pulp ............ | 1 cup | 4 oz. | 4 | 2 | 14 | 20 | 20 | 10 | 70 |
| Currants, dried ............ | 1 cup | 8 oz. | 22 | 34 | 672 | 728 | 3 | 5 | 92 |
| Currants, fresh ............ | 1 cup | 5 oz. | 8 | .. | 72 | 80 | 10 | .. | 90 |
| Dates with stones .......... | 1 cup | 8 oz. | 16 | 50 | 643 | 709 | 2 | 7 | 91 |
| Egg ........................ | 1 large | 1½ oz. | 25 | 50 | .. | 75 | 33 | 67 | .. |
| Eggplant .................. | average | 1 lb. | 25 | 15 | 80 | 120 | 21 | 12 | 67 |
| Flour, barley .............. | 1 tbsp. | ½ oz. | 4 | 2 | 46 | 52 | 8 | 4 | 88 |
| Flour, barley .............. | 1 cup | 7 oz. | 60 | 32 | 630 | 722 | 8 | 4 | 88 |
| Flour, buckwheat .......... | 1 tbsp. | ½ oz. | 3 | 1 | 47 | 51 | 7 | 3 | 90 |
| Flour, buckwheat .......... | 1 cup | 6 oz. | 42 | 18 | 540 | 600 | 7 | 3 | 90 |
| Flour, Graham ............ | 1 tbsp. | ½ oz. | 8 | 3 | 41 | 52 | 15 | 5 | 80 |
| Flour, Graham ............ | 1 cup | 5 oz. | 77 | 30 | 416 | 523 | 15 | 5 | 80 |
| Flour, rice ................ | 1 tbsp. | ½ oz. | 5 | .. | 40 | 45 | 9 | 1 | 90 |
| Flour, rice ................ | 1 cup | 8½ oz. | 77 | 6 | 767 | 850 | 9 | 1 | 90 |
| Flour, rye ................. | 1 tbsp. | ⅓ oz. | 2 | 1 | 31 | 34 | 8 | 2 | 90 |
| Flour, rye ................. | 1 cup | 5 oz. | 39 | 12 | 459 | 510 | 8 | 2 | 90 |
| Flour, white ............... | 1 tbsp. | ⅓ oz. | 4 | 1 | 29 | 34 | 12 | 3 | 85 |
| Flour, white ............... | 1 cup | 5 oz. | 63 | 15 | 438 | 516 | 12 | 3 | 85 |
| Flour, whole-wheat ......... | 1 tbsp. | ⅓ oz. | 5 | 2 | 28 | 35 | 15 | 5 | 80 |
| Flour, whole-wheat ......... | 1 cup | 5 oz. | 80 | 25 | 420 | 525 | 15 | 5 | 80 |
| Gluten meal (20-per-cent) ... | 1 cup | 6 oz. | 110 | 10 | 501 | 621 | 20 | 2 | 78 |
| Gluten meal (40-per-cent) ... | 1 cup | 6 oz. | 279 | 15 | 306 | 600 | 40 | 2.5 | 57.5 |

| Food | Amount | Weight | Protein | Fat | Carbo-hydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo-hydrate |
|---|---|---|---|---|---|---|---|---|---|
| Granola | 1 cup | 5 oz. | 78 | 6 | 425 | 509 | 15 | 1 | 84 |
| Hominy, uncooked | 1 cup | 8 oz. | 76 | 14 | 716 | 806 | 9 | 2 | 89 |
| Lemon juice | 1 lemon | 1½ oz. | .. | .. | 15 | 15 | .. | .. | 100 |
| Lemon juice | 1 tbsp. | ½ oz. | .. | .. | 5 | 5 | .. | .. | 100 |
| Lentils, cooked | 1 cup | 8 oz. | 72 | 4 | 192 | 268 | 30 | 2 | 68 |
| Lentils, uncooked | 1 cup | 7 oz. | 210 | 19 | 483 | 712 | 30 | 2 | 68 |
| Lettuce | 1 large head | 8 oz. | 12 | 4 | 32 | 48 | 25 | 14 | 61 |
| Macaroni, cooked | 1 cup | 8 oz. | 29 | 34 | 156 | 219 | 14 | 15 | 71 |
| Macaroni, uncooked | 1 cup | 3 4/5 oz. | 59 | 9 | 324 | 392 | 15 | 3 | 82 |
| Malted milk | 1 tbsp. | ½ oz. | 9 | 11 | 38 | 58 | 15 | 19 | 66 |
| Meltose | 1 tbsp. | ⅔ oz. | .. | .. | 57 | 57 | .. | .. | 100 |
| Milk, whole | 1 cup | 8 oz. | 30 | 86 | 44 | 160 | 19 | 54 | 27 |
| Milk, skim | 1 cup | 8 oz. | 32 | 6 | 48 | 86 | 37 | 7.5 | 55.5 |
| Milk, evaporated | 1 tbsp. | ½ oz. | 4 | 10.5 | 5.5 | 20 | 19 | 52 | 29 |
| Milk, evaporated | 1 cup | 8 oz. | 60 | 172 | 88 | 320 | 19 | 52 | 29 |
| Molasses | 1 tbsp. | ⅔ oz. | .. | .. | 54 | 54 | .. | .. | 100 |
| Molasses | 1 cup | 8 oz. | .. | .. | 645 | 645 | .. | .. | 100 |
| Nut butter | 1 tbsp. | ½ oz. | 17 | 62 | 10 | 89 | 19 | 69.5 | 11.5 |
| Nuts, almonds, chopped | 1 cup | 6 oz. | 147 | 878 | 35 | 1,060 | 14 | 83 | 3 |
| Nuts, almonds, shelled | 1 cup | 5½ oz. | 135 | 805 | 33 | 973 | 14 | 83 | 3 |
| Nuts, Brazil, chopped | 1 cup | 7 oz. | 139 | 1,117 | 57 | 1,313 | 11 | 85 | 4 |
| Nuts, filberts, chopped | 1 cup | 6½ oz. | 118 | 959 | 99 | 1,176 | 10 | 82 | 8 |
| Nuts, filberts, shelled | 1 cup | 6 oz. | 109 | 885 | 91 | 1,085 | 10 | 82 | 8 |
| Nuts, peanuts, shelled | 1 cup | 5 oz. | 141 | 444 | 121 | 706 | 20 | 63 | 17 |
| Nuts, pecans, shelled | 1 cup | 5½ oz. | 61 | 1,034 | 98 | 1,193 | 5 | 88 | 7 |

| Food | Amount | Weight | Protein | Fat | Carbo-hydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo-hydrate |
|---|---|---|---|---|---|---|---|---|---|
| Nuts, walnuts, chopped ..... | 1 cup | 5½ oz. | 106 | 930 | 100 | 1,136 | 10 | 83 | 7 |
| Nuts, walnuts, shelled ....... | 1 cup | 4½ oz. | 90 | 750 | 60 | 900 | 10 | 83 | 7 |
| Nuttolene ....................... | | 1 lb. | 230 | 443 | 130 | 803 | 29 | 55 | 16 |
| Nuttolene, diced ............ | 1 cup | 6 oz. | 86 | 166 | 49 | 301 | 29 | 55 | 16 |
| Oatmeal, cooked ............ | 1 cup | 8 oz. | 28 | 10 | 112 | 150 | 19 | 7 | 74 |
| Oatmeal, uncooked .......... | 1 tbsp. | ½ oz. | 10 | 4 | 44 | 58 | 18 | 7 | 75 |
| Oatmeal, uncooked .......... | 1 cup | 5 oz. | 100 | 40 | 440 | 580 | 18 | 7 | 75 |
| Oats, rolled, cooked ......... | 1 cup | 8 oz. | 28 | 10 | 112 | 150 | 19 | 7 | 74 |
| Oats, rolled, uncooked ....... | 1 tbsp. | ¼ oz. | 5 | 2 | 22 | 29 | 18 | 7 | 75 |
| Oats, rolled, uncooked ....... | 1 cup | 2½ oz. | 50 | 20 | 220 | 290 | 18 | 7 | 75 |
| Oil, cooking ................ | 1 tbsp. | ½ oz. | .. | 135 | .. | 135 | .. | 100 | .. |
| Oil, olive .................. | 1 tbsp. | ½ oz. | .. | 135 | .. | 135 | .. | 100 | .. |
| Oil, salad .................. | 1 tbsp. | ½ oz. | .. | 135 | .. | 135 | .. | 100 | .. |
| Olives, chopped ............ | 1 cup | 6 oz. | 12 | 415 | 30 | 457 | 2 | 91 | 7 |
| Onion ...................... | 1 | 3 oz. | 5 | 3 | 32 | 40 | 12.5 | 7.5 | 80 |
| Onions, grated .............. | 2 tbsp. | 2 oz. | 3 | 2 | 24 | 29 | 1 | 1 | 98 |
| Onion juice ................. | 1 tbsp. | ½ oz. | .. | .. | 12 | 12 | 1 | 1 | 98 |
| Peaches, dried .............. | 1 cup | 3 oz. | 17 | 6 | 225 | 248 | 7 | 2 | 91 |
| Peach sauce ................ | 1 cup | 8 oz. | 5 | 3 | 152 | 160 | 3.5 | 1.5 | 95 |
| Peas, dried, cooked .......... | 1 cup | 7 oz. | 98 | 7 | 245 | 350 | 28 | 2 | 70 |
| Peas, dried, uncooked ....... | 1 cup | 6 oz. | 174 | 18 | 408 | 600 | 29 | 3 | 68 |
| Peas, green, cooked ......... | 1 cup | 6½ oz. | 48 | 6 | 136 | 190 | 25 | 3 | 72 |
| Peas, mashed ............... | 1 cup | 7½ oz. | 66 | 8 | 191 | 265 | 25 | 3 | 72 |
| Peas purée ................. | 1 cup | 8 oz. | 68 | 8 | 204 | 280 | 24 | 3 | 73 |
| Pineapple, canned .......... | 1 cup | 8 oz. | 4 | 7 | 155 | 166 | 2 | 4 | 94 |

| Food | Amount | Weight | Protein | Fat | Carbo-hydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo-hydrate |
|---|---|---|---|---|---|---|---|---|---|
| Potatoes, Irish, mashed ..... | 1 cup | 8 oz. | 24 | 64 | 166 | 254 | 9 | 25 | 66 |
| Potatoes, sweet, mashed ..... | 1 cup | 8 oz. | 28 | 45 | 393 | 466 | 6 | 10 | 84 |
| Potato water ............... | 1 cup | 8 oz. | 23 | .. | 4 | 27 | 85 | .. | 15 |
| Protose ..................... | ..... | 1 lb. | 368 | 256 | 160 | 784 | 47 | 33 | 20 |
| Prunes, cooked ............. | 1 cup | 8 oz. | 7 | 2 | 211 | 220 | 3 | 1 | 96 |
| Pumpkin, cooked ........... | 1 cup | 8 oz. | 9 | 2 | 49 | 60 | 15 | 3 | 82 |
| Radishes, grated ........... | 1 cup | 4 oz. | 6 | 1 | 27 | 34 | 18 | 3 | 79 |
| Raisins .................... | 1 cup | 4 oz. | 12 | 35 | 355 | 402 | 3 | 9 | 88 |
| Raspberries, red, fresh [2] .... | 1 cup | 5 oz. | 6 | .. | 74 | 80 | 8 | .. | 92 |
| Raspberries, black, fresh .... | 1 cup | 5 oz. | 10 | 13 | 73 | 96 | 10 | 13 | 77 |
| Raspberry sauce, black ...... | 1 cup | 8 oz. | 15 | 10 | 175 | 200 | 7.5 | 5 | 87.5 |
| Raspberry sauce, red ....... | 1 cup | 8 oz. | 10 | .. | 176 | 186 | 5 | .. | 95 |
| Rhubarb, uncooked ......... | 1 cup | 2 oz. | 1.5 | 1.5 | 9 | 12 | 12 | 12 | 76 |
| Rice, boiled ............... | 1 cup | 8 oz. | 26 | 3 | 228 | 257 | 9 | 1 | 90 |
| Rice, uncooked ............ | 1 cup | 8½ oz. | 74 | 6.5 | 734 | 814.5 | 9 | 1 | 90 |
| Spaghetti, cooked .......... | 1 cup | 8 oz. | 40 | 32 | 144 | 216 | 18 | 15 | 67 |
| Spaghetti, uncooked ........ | 1 cup | 3 oz. | 43 | 1 | 271 | 315 | 13 | .. | 87 |
| Spinach, cooked ............ | 1 cup | 6 oz. | 16 | 12 | 22 | 50 | 32 | 24 | 44 |
| Spinach, raw ............... | 1 qt. | 4 oz. | 9 | 6.5 | 12 | 27.5 | 32 | 24 | 44 |
| Squash, cooked ............. | 1 cup | 8 oz. | 8 | 10 | 98 | 116 | 7 | 8 | 85 |
| Strawberries, fresh ......... | 1 cup | 6 oz. | 7 | 10 | 52 | 69 | 10 | 12 | 78 |
| Strawberry sauce ........... | 1 cup | 8 oz. | 7 | 8 | 182 | 197 | 3.5 | 4 | 92.5 |
| Sugar, granulated .......... | 1 tbsp. | ½ oz. | .. | .. | 60 | 60 | .. | .. | 100 |
| Sugar, granulated .......... | 1 cup | 7½ oz. | .. | .. | 840 | 840 | .. | .. | 100 |

[2] For fruit juices, see Table I.

| Food | Amount | Weight | Protein | Fat | Carbo-hydrate | Total | Per Cent Protein | Per Cent Fat | Per Cent Carbo-hydrate |
|---|---|---|---|---|---|---|---|---|---|
| Sugar, powdered | 1 tbsp. | ½ oz. | .. | .. | 48 | 48 | .. | .. | 100 |
| Sugar, powdered | 1 cup | 6½ oz. | .. | .. | 736 | 736 | .. | .. | 100 |
| Sugar, loaf | 1 tbsp. | ½ oz. | .. | .. | 48 | 48 | .. | .. | 100 |
| Sugar, loaf | 1 cup | 6½ oz. | .. | .. | 736 | 736 | .. | .. | 100 |
| Sirup, Karo | 1 cup | 8 oz. | .. | .. | 960 | 960 | .. | .. | 100 |
| Sirup, maple | 1 tsp. | ¼ oz. | .. | .. | 25 | 25 | .. | .. | 100 |
| Tapioca, pearled | 1 tbsp. | ½ oz. | .. | .. | 50 | 50 | .. | .. | 100 |
| Tapioca, pearled | 1 cup | 6½ oz. | .. | .. | 640 | 640 | .. | .. | 100 |
| Tomatoes, canned | 1 cup | 8 oz. | 11 | 4 | 38 | 53 | 21 | 7 | 72 |
| Tomatoes, raw | 1 medium | 7 oz. | 2 | 24 | 33 | 59 | 4 | 41 | 55 |
| Tomatoes, strained | 1 cup | 8 oz. | 12 | 5 | 40 | 57 | 21 | 7 | 72 |
| Vegetable oysters, cooked | 1 cup | 6 oz. | 6 | 32 | 25 | 63 | 10 | 50 | 40 |
| Water cress | ........ | 1 oz. | 1.4 | .8 | 3 | 5 | 25 | 15 | 60 |
| Wheat, cracked, cooked | 1 cup | 8 oz. | 28 | 8 | 172 | 208 | 13 | 4 | 83 |
| Wheat, cracked, uncooked | 1 tbsp. | ½ oz. | 7 | 2 | 44 | 53 | 12 | 4 | 84 |
| Wheat, cracked, uncooked | 1 cup | 6 oz. | 78 | 27 | 528 | 633 | 12 | 4 | 84 |
| Wheat, cream of, cooked | 1 cup | 8 oz. | 21 | 6 | 144 | 171 | 12 | 4 | 84 |
| Wheat, cream of, uncooked | 1 tbsp. | ½ oz. | 7 | 2 | 44 | 52 | 12 | 4 | 84 |
| Wheat, cream of, uncooked | 1 cup | 7 oz. | 92 | 29 | 614 | 735 | 12 | 4 | 84 |

# INDEX